

# LABORATORIES OF DEMOCRACY: THE ECONOMIC IMPACT OF STATE ENERGY POLICIES

---

## HEARING BEFORE THE SUBCOMMITTEE ON ENERGY AND POWER OF THE COMMITTEE ON ENERGY AND COMMERCE HOUSE OF REPRESENTATIVES ONE HUNDRED THIRTEENTH CONGRESS SECOND SESSION

JULY 24, 2014

**Serial No. 113-165**



Printed for the use of the Committee on Energy and Commerce  
*energycommerce.house.gov*

U.S. GOVERNMENT PUBLISHING OFFICE

92-593 PDF

WASHINGTON : 2015

---

For sale by the Superintendent of Documents, U.S. Government Publishing Office  
Internet: bookstore.gpo.gov Phone: toll free (866) 512-1800; DC area (202) 512-1800  
Fax: (202) 512-2104 Mail: Stop IDCC, Washington, DC 20402-0001

## COMMITTEE ON ENERGY AND COMMERCE

FRED UPTON, Michigan

*Chairman*

RALPH M. HALL, Texas	HENRY A. WAXMAN, California
JOE BARTON, Texas	<i>Ranking Member</i>
<i>Chairman Emeritus</i>	JOHN D. DINGELL, Michigan
ED WHITFIELD, Kentucky	FRANK PALLONE, Jr., New Jersey
JOHN SHIMKUS, Illinois	BOBBY L. RUSH, Illinois
JOSEPH R. PITTS, Pennsylvania	ANNA G. ESHOO, California
GREG WALDEN, Oregon	ELIOT L. ENGEL, New York
LEE TERRY, Nebraska	GENE GREEN, Texas
MIKE ROGERS, Michigan	DIANA DEGETTE, Colorado
TIM MURPHY, Pennsylvania	LOIS CAPPS, California
MICHAEL C. BURGESS, Texas	MICHAEL F. DOYLE, Pennsylvania
MARSHA BLACKBURN, Tennessee	JANICE D. SCHAKOWSKY, Illinois
<i>Vice Chairman</i>	JIM MATHESON, Utah
PHIL GINGREY, Georgia	G.K. BUTTERFIELD, North Carolina
STEVE SCALISE, Louisiana	JOHN BARROW, Georgia
ROBERT E. LATTA, Ohio	DORIS O. MATSUI, California
CATHY McMORRIS RODGERS, Washington	DONNA M. CHRISTENSEN, Virgin Islands
GREGG HARPER, Mississippi	KATHY CASTOR, Florida
LEONARD LANCE, New Jersey	JOHN P. SARBANES, Maryland
BILL CASSIDY, Louisiana	JERRY McNERNEY, California
BRETT GUTHRIE, Kentucky	BRUCE L. BRALEY, Iowa
PETE OLSON, Texas	PETER WELCH, Vermont
DAVID B. MCKINLEY, West Virginia	BEN RAY LUJAN, New Mexico
CORY GARDNER, Colorado	PAUL TONKO, New York
MIKE POMPEO, Kansas	JOHN A. YARMUTH, Kentucky
ADAM KINZINGER, Illinois	
H. MORGAN GRIFFITH, Virginia	
GUS M. BILIRAKIS, Florida	
BILL JOHNSON, Ohio	
BILLY LONG, Missouri	
RENEE L. ELLMERS, North Carolina	

---

## SUBCOMMITTEE ON ENERGY AND POWER

ED WHITFIELD, Kentucky

*Chairman*

STEVE SCALISE, Louisiana	BOBBY L. RUSH, Illinois
<i>Vice Chairman</i>	<i>Ranking Member</i>
RALPH M. HALL, Texas	JERRY McNERNEY, California
JOHN SHIMKUS, Illinois	PAUL TONKO, New York
JOSEPH R. PITTS, Pennsylvania	JOHN A. YARMUTH, Kentucky
LEE TERRY, Nebraska	ELIOT L. ENGEL, New York
MICHAEL C. BURGESS, Texas	GENE GREEN, Texas
ROBERT E. LATTA, Ohio	LOIS CAPPS, California
BILL CASSIDY, Louisiana	MICHAEL F. DOYLE, Pennsylvania
PETE OLSON, Texas	JOHN BARROW, Georgia
DAVID B. MCKINLEY, West Virginia	DORIS O. MATSUI, California
CORY GARDNER, Colorado	DONNA M. CHRISTENSEN, Virgin Islands
MIKE POMPEO, Kansas	KATHY CASTOR, Florida
ADAM KINZINGER, Illinois	JOHN D. DINGELL, Michigan ( <i>ex officio</i> )
H. MORGAN GRIFFITH, Virginia	HENRY A. WAXMAN, California ( <i>ex officio</i> )
JOE BARTON, Texas	
FRED UPTON, Michigan ( <i>ex officio</i> )	

## C O N T E N T S

---

	Page
Hon. Ed Whitfield, a Representative in Congress from the Commonwealth of Kentucky, opening statement .....	1
Prepared statement .....	3
Hon. Bobby L. Rush, a Representative in Congress from the State of Illinois, opening statement .....	4
Hon. Henry A. Waxman, a Representative in Congress from the State of California, opening statement .....	5
WITNESSES	
Tom Tanton, Director of Science and Technology Assessment, Energy and Environment Legal Institute .....	7
Prepared statement .....	9
Fred Siegel, Senior Fellow, Manhattant Institute, and Scholar in Residence, Saint Francis College .....	22
Prepared statement .....	24
Steve Clemmer, Director of Energy Research and Analysis, Climate and Energy Program, Union of Concerned Scientists .....	28
Prepared statement .....	31
Steven Nadel, Executive Director, American Council for an Energy-Efficient Economy .....	48
Prepared statement .....	50
Paul E. Polzin, Director Emeritus, Bureau of Business and Economic Research, University of Montana .....	63
Prepared statement .....	65
Bernard L. Weinstein, Associate Director, Maguire Energy Institute, Cox School of Business, Southern Methodist University .....	71
Prepared statement .....	73
SUBMITTED MATERIAL	
Article, "Top Ten Myths About Wind Power and Birds," by Michael Hutchins, American Bird Conservancy, submitted by Mr. Griffith .....	96



## **LABORATORIES OF DEMOCRACY: THE ECONOMIC IMPACT OF STATE ENERGY POLICIES**

---

**THURSDAY, JULY 24, 2014**

HOUSE OF REPRESENTATIVES,  
SUBCOMMITTEE ON ENERGY AND POWER,  
COMMITTEE ON ENERGY AND COMMERCE,  
*Washington, DC.*

The subcommittee met, pursuant to call, at 10:01 a.m., in room 2123 of the Rayburn House Office Building, Hon. Ed Whitfield (chairman of the subcommittee) presiding.

Members present: Representatives Whitfield, Hall, Shimkus, Pitts, Terry, Latta, Cassidy, Olson, McKinley, Gardner, Kinzinger, Griffith, Barton, Rush, McNerney, Tonko, Engel, Green, Capps, Barrow, Castor, and Waxman (ex officio).

Staff present: Nick Abraham, Legislative Clerk; Gary Andres, Staff Director; Charlotte Baker, Deputy Communications Director; Leighton Brown, Press Assistant; Allison Busbee, Policy Coordinator, Energy and Power; Tom Hassenboehler, Chief Counsel, Energy and Power; Jason Knox, Counsel, Energy and Power; Ben Lieberman, Counsel, Energy and Power; Chris Sarley, Policy Coordinator, Environment and the Economy; Jean Woodrow, Director of Information Technology; Jeff Baran, Democratic Staff Director, Energy and the Environment; Alison Cassady, Democratic Senior Professional Staff Member; Caitlin Haberman, Democratic Policy Analyst; and Alexandra Teitz, Democratic Chief Counsel, Energy and the Environment.

Mr. WHITFIELD. I would like to call the hearing to order this morning, and the title of today's hearing, "Laboratories of Democracy: The Economic Impact of State Energy Policies."

And at this time, I would like to recognize myself for a 5-minute opening statement.

### **OPENING STATEMENT OF HON. ED WHITFIELD, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF KENTUCKY**

This is going to be an informative hearing, I believe, because we have such great witnesses that have really studied different policies being adopted by different States in a lot of different areas, and the decisions being made at the State level today about public policy, particularly as it relates to energy development, goes a long way in giving us an insight at the Federal level, because we are

having the same debates at the Federal level in the direction that we should go.

Now, President Obama has made it very clear that he believes the number 1 problem facing mankind today is climate change, and a lot of his policy decisions by his administration are being made based on his concern about climate change. Many of us on the other side of the aisle, and a lot of Democrats as well, believe that economic growth is one of the most important issues facing us today.

Now, let me just say that I read an article in Barron's 3 days ago that said before the most recent recession, there were 122 million full-time jobs in America. Four and a half years later, there are 118 million full-time jobs in America. Despite a workforce that is 1.6 million larger, and a working-age population that is 14 million larger, so full-time employment is much less today; almost 4 million less today than it was 4 ½ years ago. And then in the 2014 long-term budget outlook of CBO, which just was released, they talk about our debt held by the public today as 74 percent of GDP, and they anticipate by 2030 it is going to be 180 percent of GDP. So the economic forecasters are saying we are genuinely concerned about the impact that this is going to have on economic growth in America, and the availability of capital for economic expansion.

Supreme Court Justice Louis Brandeis described States as laboratories of democracy, and we can take some hard-known facts from decisions being made in States today, and the impact of those decisions on jobs available in those States and on economic growth. And then we are going to have the opportunity to ask our witnesses questions about it after they give their opening statements on their views, but if you do view that climate change is the most important issue facing mankind, or facing America, then you are going to go in one direction on energy policy, but if you believe economic growth is the most important, and jobs and providing income for families, then your approach is going to be a little bit different. And we know that those approaches make a big difference. For example, in North Dakota, GDP growth last year was 9.7 percent, the highest in America. And North Dakota has been the fastest-growing State in the Nation every year since 2010. And in 2012, the GDP growth in North Dakota was 20 percent. Now that is because of the State's oil boom driven by hydraulic fracking in the Bakken shale formation has been responsible for much of this growth. On the other hand, let us take a State like California. Public policy decisions being made in California are about climate change. And we hear a lot about, well, there are so many jobs being created in the wind industry and solar, and so forth, but what about the jobs being lost? But here we have at the opposite end of the spectrum from North Dakota is California, 7.4 percent unemployment rate, the highest among the 10 most populous States, a stagnating economy, some of the most expensive energy in the Nation. It has been rated the worst State for doing business 10 years in a row by Chief Executive magazine. Now, I would be the first to say it is a beautiful State and we all love to go there, but businesses are leaving that State. So what we want to look at today is the impact of these decisions and setting the priorities, because we can learn a lot from the States as we continue our debate at the Federal level on what

direction we should go. President Obama wants to go down the pathway of California, which has proved not to be successful.

[The prepared statement of Mr. Whitfield follows:]

#### PREPARED STATEMENT OF HON. ED WHITFIELD

Supreme Court Justice Louis Brandeis famously described States as laboratories of democracy, and in today's hearing we will explore this concept in the context of energy policy. We are pleased to have a panel of witnesses who can share insight about these State-level experiences.

Under our federalist system, States have considerable latitude to try out different ideas. Those State-level policy experiments that are successful can be copied by other States, as well as by the Federal Government. And those that fail can serve as a cautionary tale and prevent others from making the same mistake.

We see many differences between States on energy policy, and widely varying results. Some States have low electricity rates and others do not. Some have gasoline prices close to \$3.25 a gallon and others above \$4.00 a gallon. And since a State's energy policy can affect its overall economic prospects, it is no surprise that some States enjoy very low unemployment and fast-growing economies, while others struggle with high unemployment and economic stagnation.

Today, we will hear more about these State differences as they relate to energy. And there is much to learn. According to the Department of Commerce's Bureau of Economic Analysis, many of the fastest-growing State economies did so due to oil, natural gas and coal production. For example, North Dakota's responsible development of its energy resources is a big part of the reason it has the Nation's lowest unemployment rate and fastest-growing economy. Additional States making the top ten—Texas, Colorado, Oklahoma, West Virginia, and Wyoming—are also making good use of their in-state energy supplies and support technologies like hydraulic fracturing as well as energy infrastructure projects like the southern leg of the Keystone XL pipeline. Other States were able to weather the recent recession because of their energy policies, such as Pennsylvania where 90 percent of new job growth between 2005 and 2012 came from the oil and gas sector. In the neighboring State of New York, which has the same shale potential but has prohibited modern oil and gas extraction techniques, economic growth has languished.

I might add that these pro-fossil-energy States are not just helping the wealthy—quite the contrary, they are benefitting lower-income households the most. For one thing, energy production and energy infrastructure projects create many high wage blue-collar jobs that provide badly needed opportunities for upward mobility. For another, the resultant lower energy costs disproportionately help the least fortunate who would otherwise struggle to pay their bills. In contrast, the anti-drilling, anti-fracking, anti-Keystone, keep-it-in-the-ground philosophy toward fossil fuels that we see in other States is an energy policy that only the 1 percent can afford. Mr. Fred Siegel wonderfully illustrates this issue in his testimony when he talks about the “gentry liberals” driving an environmental policy that satisfies their desires at the expense of the general population.

Washington should be learning from these State successes and applying the same pro-energy policies to federally controlled lands and offshore areas. But unfortunately we are not doing so. In fact, recent reports from the Congressional Research Service and Energy Information Administration show overall declines in energy production from Federal lands. North Dakota and others have set a good example for the Nation, but that example is being ignored here in Washington. It is time for that to change.

At the opposite end of the spectrum, California has one of the Nation's highest unemployment rates, a stagnating economy, and some of the most expensive energy in the Nation. It has been rated the worst State for doing business 10 years in a row by *Chief Executive* magazine. This is due in part to costly energy regulations such as the global warming measures that are sapping the State of its vitality and chasing away businesses. Yet we see the Obama administration imposing these same failing policies on the Nation as a whole.

Indeed, it often seems like the administration has it backwards—instead of copying the good State energy ideas and avoiding the bad ones, it is doing precisely the opposite.

We can and should have a reasonable debate over which States have the best ideas on energy, but I hope we can all agree that this kind of State-level experimentation should be allowed to continue. Unfortunately, it is under threat by one-size-fits-all Federal regulations that preempt State choice and impose cookie-cutter Federal approaches. We see this most clearly in the agency's regulatory war on coal

which leaves States no option but to forbid new coal-fired capacity and impose harsh provisions on existing coal plants. I believe States that want to continue using coal as an affordable and reliable component of its electricity mix should be given the opportunity to do so without Federal interference.

In any event, I hope we can all gain from learning more about what is going on at the State level on the energy issues that matter to this subcommittee. Thank you.

Mr. WHITFIELD. So with that, at this point in time, I would like to recognize the ranking member of the committee, Mr. Rush, for 5 minutes for his opening statement.

**OPENING STATEMENT OF HON. BOBBY L. RUSH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS**

Mr. RUSH. Well, thank you, Mr. Chairman. I want to thank you for holding today's hearing on the economic impacts of State energy policies.

Mr. Chairman, currently, 29 States and the District of Columbia have already adopted renewal—renewable energy standards, or renewable portfolio standards, while an additional 8 States have non-binding renewable energy standards. And we know that these policies have helped to grow the renewable energy industry in our Nation with fully 67 percent of the all non-hydro renewable capacity growth occurring in States with RPS policies between 1998 and 2012.

Mr. Chairman, this investment in renewables as—has helped not only make us less dependent on carbon-intensive energy sources, but has also created tens of thousands of good-paying jobs all across the country in construction, in manufacturing, in retrofitting and in other sectors. For instance, Mr. Chairman, the U.S. solar industry now employs more than 142,000 workers, at more than 6,000 businesses located in all 50 States. Additionally, the development of the wind industry has also generated tremendous economic benefits, so that by the end of 2013, the wind sector alone was employing more than 50,000 jobs all across this Nation. In fact, Mr. Chairman, my home State, the State of Illinois, has been at the heart of the wind industry in this Nation, leading the way in both turbine manufacturing and also electricity production. Illinois wind powered the equivalent of 880,000 homes in 2013, supplying nearly 5 percent of the State's electricity, while hosting 2,195 wind turbines and at least 36,000 manufacturing facilities that build wind turbine components. Aside from its forward-thinking renewable energy policies, my State, the great State of Illinois, is among the top 10 of the American Council for Energy Efficient Economy, or ACEEE, State efficiency scoreboard, as Mr. Nadel, as the executive director, notes in his written testimony before this subcommittee today.

In Illinois, policymakers have implemented an energy efficient resource standard that has helped to decrease the Nation's overall electricity usage, while also working with utilities to deliver savings to Government agencies and to low-income consumers. As Mr. Nadel points out, the Illinois Department of Commerce and Economic Opportunity, the agency responsible for implementing the State's energy efficiency program, was named the ACEEE's star partner of the year just this very year of 2014. Additionally, Mr. Chairman, members of the subcommittee, my State, the great



State of Illinois, was also the first State in the Midwest to adopt the 2012 International Energy and Conservation Code, a national model building code prepared by the International Code Council.

So, Mr. Chairman, we are not California, we are not Kentucky, we are Illinois, and it is my sincere hope that today's hearing will serve as a platform not just to bash California or bash the Obama administration over its much-needed climate change policies, but rather to hear about my State and other States; States that constructively are enacting smart and resourceful strategies that propel our country forward by creating jobs and investment, business more independent, more secure, while also reducing the cost of energy both in our pocketbooks as well as in our impact on our environment.

Mr. Chairman, thank you, and I agree with you, we have a marvelous panel of witnesses today, experts in their field, and I look forward to hearing every word that they have to say to us. Thank you.

Mr. WHITFIELD. Thank you, Mr. Rush. And Mr. Upton is not going to make an opening statement, so is there anyone on our side of the aisle that would like to make a statement about the hearing this morning?

OK. Well, at this time, I would like to recognize the gentlemen from California, Mr. Waxman, for a 5-minute opening statement.

**OPENING STATEMENT OF HON. HENRY A. WAXMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA**

Mr. WAXMAN. Thank you, Mr. Chairman.

Today's hearing focuses on the economic impacts of State energy policies. It is an opportunity to examine the growth of the clean energy sector, and the positive economic benefits of renewable energy and energy efficiency.

States have taken a leadership role in harnessing the power of renewable energy. Twenty-nine States and the District of Columbia have enacted renewable portfolio standards to generate more electricity from clean energy sources. As a result of these State programs and Federal incentives, we have doubled our capacity to generate renewable electricity from wind and solar in just 5 years. This is important because renewable and low carbon energy sources are a fundamental part of any serious plan to address climate change.

In May, the International Energy Agency warned that the world needs to invest trillions of dollars in renewable and other clean energy technologies over the coming decades in order to avoid the worst impacts of climate change. That is a potentially huge economic opportunity for the United States. Investing in renewable energy is not only good for the climate; it is also a boon for U.S. manufacturing, jobs and competitiveness.

Both blue States and red States have the success stories to prove it. Texas ranks first in the country for wind power installations and wind industry jobs. California ranks second. The wind industry has injected more than \$11 billion into California's economy, and \$23 billion into the Texas economy. This investment translates into jobs and a stronger, more diverse tax base.

Energy efficiency also will help play a key role as the world grapples with the challenge of reducing carbon pollution and slowing dangerous climate change. The International Energy Agency has concluded if the world does not take action to reduce carbon pollution by 2017, then the energy infrastructure existing at that time will lock us into a path toward devastating climate change. But if we invest now in energy efficiency, we can give ourselves more time. According to the IEA, the rapid deployment of energy efficiency measures would give the world at least 5 additional years to develop long-term solutions.

States have taken action to make our industry, our buildings and our transportation system more energy efficient. This is a common-sense policy that saves businesses and families money on their energy bills while cutting pollution.

But we need to do more. We need a national commitment to clean energy and energy efficiency in order to tackle the urgent threat of climate change. The Clean Power Plan proposed by EPA would make that commitment.

The plan lays out key building blocks for how States can cut emissions from the Nation's largest source of uncontrolled carbon pollution: power plants. One building block is using electricity more efficiently. EPA based its proposal on what States are already doing to make homes and businesses more efficient.

Another building block is generating more power from zero and low-carbon energy sources. EPA looked at the renewable energy potential in each region of the country to determine the scope of the opportunities here for States. EPA found that all States can do more, even Kentucky, to tap their clean energy potential.

The Clean Power Plan is an eminently reasonable and achievable proposal. It gives States the flexibility to choose how to achieve critical reductions in power plant carbon pollution. And it sets us on a path toward cleaner air, better health, a safer climate, and a stronger 21st century economy. States will play a critical role in the success of the Clean Power Plan.

So I thank the witnesses for being here. And I would be happy to yield the half a minute to anybody who wants to say anything. If not, I yield it back, and look forward to the witnesses.

Mr. WHITFIELD. Thank you very much, Mr. Waxman.

And that concludes the opening statements. And so I want to welcome the panel of witnesses. As I said in the beginning, we understand and know that all of you have looked into this very much, and that you are dedicated and committed to it, and we look forward to your testimony and then the opportunity to ask questions.

On the panel today, we have Mr. Tom Tanton, who is the Director of Science and Technology Assessment of the Energy and Environment Legal Institute. And what I am going to do, I am just going to introduce you individually right before you give your remarks. So, Mr. Tanton, you are recognized for 5 minutes for your opening statement. And be sure and turn your microphone on and get it close as possible.

**STATEMENTS OF TOM TANTON, DIRECTOR OF SCIENCE AND TECHNOLOGY ASSESSMENT, ENERGY AND ENVIRONMENT LEGAL INSTITUTE; FRED SIEGEL, SENIOR FELLOW, MANHATTAN INSTITUTE, AND SCHOLAR IN RESIDENCE, SAINT FRANCIS COLLEGE; STEVE CLEMMER, DIRECTOR OF ENERGY RESEARCH AND ANALYSIS, CLIMATE AND ENERGY PROGRAM, UNION OF CONCERNED SCIENTISTS; STEVEN NADEL, EXECUTIVE DIRECTOR, AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY; PAUL E. POLZIN, DIRECTOR EMERITUS, BUREAU OF BUSINESS AND ECONOMIC RESEARCH, UNIVERSITY OF MONTANA; AND BERNARD L. WEINSTEIN, ASSOCIATE DIRECTOR, MAGUIRE ENERGY INSTITUTE, COX SCHOOL OF BUSINESS, SOUTHERN METHODIST UNIVERSITY**

**STATEMENT OF TOM TANTON**

Mr. TANTON. Thank you, Mr. Chairman, members of the committee.

I intend the testimony to inform the committee of essentially how to look at State energy policies in 2 regards. We have heard about climate change being an important goal. Whether you believe that or not, one also needs to undertake measures in the most cost-efficient manner to reduce carbon emissions. Many of the State energy policies, and I will focus primarily on California, do not do that. They actually take the most expensive, the least efficient way, which leads to unintended consequences like emissions leakage. We are driving businesses to States and countries that are less carbon efficient than California already is, thereby increasing total global emissions; counterproductive to the goal.

In summary, the economic impacts of State energy policies, including the RPS, as well as others, are huge. Generally speaking, the costs exceed the benefits, even when indirect and externality costs are included, but the economic impacts cannot be attributable solely to laboratories of democracy simply because many of the policies and regulations, and implementation thereof, take place outside the democratic process. They take place administratively or evolve outside, either through mission creep, or lack of legislative oversight. Costs and burdens are often imposed on residents in neighboring States creating extraterritoriality and unconstitutionality.

What I do in, say, Minnesota affects generators and residents and taxpayers in North Dakota, as the Tenth Circuit found last May. Costs are often hidden or transferred to some other party. An example of that is wind generation requires both balancing and backup; backup for when the wind is not blowing, balancing for when the wind is blowing, and that imposes inefficiencies on the—on those balancing plants. Similarly, the taxes that are imposed by California's A.B.32 Cap and Trade provisions affect residents in other States.

Finally, there is misinformation. A good democracy relies on informed citizens, and informed committee members, for that matter, and there is often misinformation that is taken at face value that is spread by either rent-seekers and bureaucratic advocates such as the cost of certain technologies. The other thing, and this is crucial

to keep in mind, the cost of certain technologies; wind, natural gas fired combined cycles, et cetera, are often inappropriately characterized as being cost competitive, but when one considers the fact that wind provides only energy, while natural gas fired combined cycles provide energy and capacity, the value proposition is different, so it is irrelevant that the costs are the same.

Using States to test policy approaches and mechanisms results in smaller negative impacts overall, and easier-to-correct mechanisms. With all due respect, Congress moves slower than most States. Each State has different needs and opportunities. What works in Georgia does not work in California, doesn't work in Florida, et cetera. Now, opportunities and challenges vary tremendously. The more centralized a policy is, the harder it is to correct and the more subject it is to cronyism and nefarious activities.

Ideally, the policy should be at the individual level. I should get to choose what I buy. Increasing intervention is seldom the solution to programs that have been put in place through intervention. The solution to intervention problems is less intervention.

Various Federal programs have also impeded efficient achievement of State policy goals. The production tax credit has led to too much intermittent, volatile wind generation, which threatens the reliability of the grid in a number of States. The renewable fuel standard also impedes achievement of other important State goals, like providing reasonably priced food and fiber.

There are a number of economically sound policies in the various States. There was mention of North Dakota earlier. California also has some bright lights, or shining lights. The economically sound policies are invariably the result of democratic activities, not administrative or bureaucratic activities.

And with that, I will be happy to answer any questions as—at the time.

[The prepared statement of Mr. Tanton follows:]

Testimony Before the United States House  
 Subcommittee on Energy and Power  
 Honorable Ed Whitfield, Chair  
 By Tom Tanton  
 Director of Science and Technology Assessment  
 Energy and Environment Legal Institute<sup>1</sup>  
 President of T<sup>2</sup> and Associates  
 July 24, 2014

Thank you, Chairman Whitfield and members of the subcommittee for inviting me to testify today on various State energy policies. I intend this testimony to inform discussion on “Laboratories of Democracy: The Economic Impacts of State Energy Policies.” My comments reflect professional experiences over nearly four decades in California and elsewhere with such programs ostensibly put in place to reduce environmental impacts, enhance energy security or provide other broad social benefit. I attach a short bio for your convenience. I also attach excerpts from a select few papers that may provide the subcommittee with additional detail.

**Summary:**

- The economic impacts of State energy policy are quite large, with costs generally being larger than benefits, when indirect costs and externalities are included.
- The economic impacts cannot be attributable entirely to “laboratories of democracy” for the simple reason they often are adopted or evolve outside of democratic mechanisms:
  - Due to mission creep and/or lack of legislative oversight
  - Costs and burdens may be imposed on residents in neighboring states, creating unconstitutional extraterritoriality, such as with Renewable Portfolio Standards
  - Costs are often ‘hidden’ from consumers, such as the cross subsidy inherent in many Net Metering Programs and the ‘tax’ imposed through cap and trade mechanisms
  - Misinformation taken at face value by citizens that is disseminated by rent seekers and bureaucratic advocates, such as the cost of certain technologies
- Using states to test policy approaches and mechanism results in smaller negative impacts overall and easier-to-correct standards and regulations
- Each state has different needs, opportunity and challenges, and may benefit from lessons learned in earlier attempts in other states (both positive and negative.) It is unlikely that what works efficiently or effectively in one state is ideal for another state. The same is true for transfer between states and individuals. The more centralized a policy is, the more susceptible it is to rent seeking behavior and cronyism.
- Increasing intervention seldom fixes issues created by poorly designed intervention policies.
- Various Federal programs impede efficient achievement of important State Energy Policy goals.
  - The Production Tax Credit has led to building of enormous amounts of variable and volatile electrical generation threatening State reliability of the electrical grid.

---

<sup>1</sup> Mr. Tanton’s affiliation with EELI and with T<sup>2</sup> & Associates is provided for identification purposes only. He may be contacted at [ttanton@fastkat.com](mailto:ttanton@fastkat.com).

- The Renewable Fuel Standard has impeded important State goals, including maintaining affordable food and fiber prices, with resulting economic disruptions.
- There are a number of economically sound State energy policies, such as North Dakota's development regime and California's Senate Bill (SB) 4 (hydrofracturing regulations) and others. The economically sound policies are invariably the result of democratic and representative Legislative deliberations, not the result of solely Administrative and bureaucratic actions.

#### **Background:**

While my comments focus on estimates of monetary costs of specific state policies, it is important to recognize that most such policies also bring with them non-monetary costs, externalities and of course unintended consequences. I focus on a select list of electricity and transportation policies but my conclusions can generally be applied to other policies such as demand side management.

As one example, California and numerous other States have so called Renewable Portfolio Standards (RPS). These Standards, while varying in eligible technologies and amounts, require utilities to supply a portion of all electricity in their territory from certain renewables. The most common technology used to satisfy these requirements is industrial wind. However, wind generated electricity is of much less value to the grid, as it provides energy but no capacity, and thus requires so called backup. Further, because it is highly volatile, it also requires balancing<sup>2</sup> to keep the grid in operational balance between instantaneous demand and supply. These two requirements add significant cost, but those costs are typically 'offloaded' to others and not reflected in the artificial price paid to the wind developers that cause those costs to be incurred. A paper I co-wrote in 2012, included as Attachment 2, provides additional details, illustrating how wind is actually twice as expensive as claimed. While the aggregate cost to ratepayers depends upon a variety of factors (e.g. existing and future fleet of generators, load profile, competitive alternatives, etc.) the cost just in California totals in the billions and reflects perhaps a 20% increase in cost over what they would have been absent the RPS. My organization (under its former name American Tradition Institute) has published a number of papers produced by Beacon Hill Institute and State level think tanks on the cost borne by various states due to their own RPSs. They are provided in attachment 3. Further, these RPS impose costs on neighboring States' residents for transmission and grid services. They create their own devastating non-monetized environmental costs, such as endangered species mortality (see Eagle deaths from wind turbines) and mass kill offs (see avian 'frying' from the attractive nuisance of concentrated solar facilities like Ivanpah). They may also create new and yet unquantified impacts like hazards to air traffic<sup>3</sup>.

Given how the interstate electric grid works, electric energy policy in one state imposes cost and administrative burdens on residents in neighboring states. Each State's grid supports and is supported by connections to a multistate generation and transmission system that must be kept in perfect harmony between supply and demand. Restrictions and mandates in one state impose costs and burden in other states to maintain that harmony. This creates a facially unconstitutional instance of extraterritoriality, confirmed on April 18, 2014 by the U.S. District Court for the District of Minnesota. The Court struck down the State of Minnesota's restrictions on importing electricity from coal power plants in other states. The court held that these restrictions improperly regulated electric generators and utilities outside the state. The decision sets a precedent that could

<sup>2</sup> "Backup" is required when the wind is not blowing; "balancing" is required when the wind IS blowing.

<sup>3</sup> "Evaluation of Glare at the Ivanpah Solar Electric Generating System," Sandia National Labs, July 17, 2014

threaten state regulations of imported fuel and electricity, such as the numerous renewable power standards and California's low carbon fuel standard.

Masquerading as a policy to encourage residential solar, net metering in several states act though regressive cross subsidies. Forty-three states plus the District of Columbia have net metering policies and regulations. While these policies vary in details, customers with such systems are typically credited at the full retail electric rate for any excess electricity they generate. The retail rate includes the price of the power itself, as well as the cost of paying for the grid which delivers electricity to and from distributed customers and assures that power supplies operate safely and reliably. Electric companies are required to buy this power at the retail rate, even though it would cost less to produce the electricity themselves or to buy the power on the wholesale market. This cross subsidy represents perhaps 35-55 percent of the retail rate for those net-metered customers, and is ultimately paid by non-participating customers<sup>4</sup>.

Perhaps most famous, or infamous, is California's "Global Warming Solutions Act" more commonly referred to as AB32. This energy/environmental policy is imposing tremendous cost on California monetarily as I documented in 2010 (see attachment 4) in the billions of dollars and lost gross state product of perhaps 2% (exceeding an anemic recovery of less than one percent) and loss of 75,000 to over one million jobs. It provides a state level experiment that provides significant information for policy makers in other state and in Congress. From a strictly environmental effectiveness standpoint (assuming *arguendo* that costs are no object), the policy fails miserably. By imposing disparate burdens on productive activity in California, productive activity is pushed to other locales, typically, where carbon intensity is higher, resulting in environmental leakage and little reduction in global carbon emissions or even increases in later years. California should be leading in manufacturing, being highly carbon efficient, yet we're losing manufacturing to other states.

More pernicious is the resulting premature mortality, imposed especially on lower income and less fortunate. Significant perhaps is the application of cap and trade rules (only part of AB32) to transportation fuels, which is scheduled to go into effect January 2015. This new, permanent hidden gas tax created by the California Air Resources Board (CARB) and implemented without legislative approval will cost Californians at least 15 cents to perhaps a dollar more per gallon of gas, with that amount continuing to increase over time. This is in addition to the more than 70 cents that is already paid in state and federal gas taxes. There is pending legislation (California Assembly Bill 69) that would delay that portion of AB32 implementation, but the legislation doesn't affect other sectors of the economy already subject to cap and trade, or more broadly AB32.

Australia, under their own representative democratic system, has recently moved to correct the negative imposition of their own carbon tax, voting July 16 to repeal it.

While soft sold as a public health measure, CARB's implementation of AB32 actually harms public health. Using the EPA's own comparative risk method and data, I have estimated that the pending application of cap and trade rules to transportation fuels will lead to 340 to over 560 premature deaths in California every year. This is because the loss of disposable income results in premature

<sup>4</sup> See Thomas Tanton, *Reforming Net Metering: Providing a Bright and Equitable Future*, An ALEC Policy Paper, March 2014

death, as people have less to spend on healthy lifestyles and nutrition. These numbers increase with larger rates of death as the tax increases in future years. These impacts will more heavily impact California's poor and minority communities because they spend a larger portion of their disposable income on energy.

California energy policy in transportation also provides the Committee with some "experimental observations." California has had numerous programs to encourage or force alternative transportation fuels into the market. In each case, they have failed due to lack of consumer acceptance of the "alternative" subsidized or mandated by the government. Based on my experiences such programs generally fall short in enabling:

- *Real competition.* In fact, by mandating certain percentages of specified technologies, the programs stifles competition on a level playing field, resulting in impeded innovation.
- *Adequate time for markets to evolve.* Specifying time frames for market evolution will likely ad has led to market disruptions and rent seeking.
- *Flexibility to accommodate or account for future changes in the market.* For example, EIA predicts a 13% reduction in imports of petroleum by 2035, reducing the strategic importance of petroleum.<sup>5</sup> The Keystone pipeline would also significantly reduce the strategic importance of petroleum, depending on its ultimate construction and operation. Various vehicle types, such as electric vehicles, pose their own strategic concerns, such as Rare Earth metals needed for batteries and catalysts. Similarly, hydraulic fracturing has dramatically increased the supply and reduced the price of natural gas, a factor unforeseen when many programs were justified based on limited and diminishing supplies of domestic natural gas.
- *Informed consumers.* Consumers will face additional, unquantified, costs from purchase of qualified vehicles in addition to higher first costs, further compounded by conflicting policies. With respect to electric vehicles, for example, EPA's promulgation of revisions to Maximum Achievable Control Technologies (MACT) and various states' renewable portfolio standards increase the cost of electricity (necessary for recharging EV) by up to 40%, making the consumer's going forward cost to own an EV even more prohibitive and less competitive.

For additional detail, I refer the Members to Testimony I provided July 10, 2012 to this Committee regarding the "Open Fuel Standard" (HR1687) and I will not repeat those here today.

Finally, circumstances change and legislation must allow the flexibility to account for future knowledge and circumstances. I offer the following recommended perspectives to the Committee as they deliberate on the State's as Laboratories of Democracy.

1. Policies must be technology neutral and real performance based. It is best to not even refer to specific fuels or technology, to accommodate technology, resource and market changes that will occur, but that are unforeseen,
2. Enabling true consumer choice should be paramount and recognize that consumers have very diverse—and expanding—needs and opportunities, and that time demands impose costs, as does reliability and energy quality.

<sup>5</sup> [http://www.eia.gov/forecasts/aeo/chapter\\_executive\\_summary.cfm](http://www.eia.gov/forecasts/aeo/chapter_executive_summary.cfm)



3. The experimental nature of such policies should be explicit, with adequate monitoring of performance to metrics, contingency plans for unanticipated outcomes,<sup>6</sup> and recognition that non-willing participants (such as residents in neighboring states)
4. Policies should be tested for cost effectiveness relative to the performance metrics. As one example, natural gas fired combined cycles can reduce carbon emissions from coal plants at one-tenth the cost per ton reduced, or ten times as much for a given expenditure.
5. The value of various performance metrics is not proportional. A ton of NO<sub>x</sub> reduced in a relatively polluted area is vastly different than a ton reduced in an area already achieving ambient air quality standards.
6. Recognize that critical infrastructures are dependent on and depended upon by all other critical infrastructures...they are interconnected; also recognize that policies are often in conflict and/or counterproductive. Similarly, consideration should be given to ancillary requirements, such as the need for backup and balancing of wind turbines.
7. If a policy is failing to provide real performance, measured using the metrics, don't do more of it, do less.
8. Forecast of the cost and affects of proposed policy should be done probabilistically and not deterministically.
9. If a policy succeeds in achieving its goal, be willing to declare success. Once an infant industry is capable of market competitiveness, favored treatment should end. If after decades, no competitiveness has been demonstrated, favored treatment should end.

In other words, focus on free market mechanisms and consumer choice, principles and process rather than the technology or fuel of the moment.

---

<sup>6</sup> As an example, during the 2000 California electricity market debacle, much of the \$30 billion loss to California's economy can be traced to the market clearing using reverse Dutch auction, which works during supply surplus conditions. A contingency of 'paid as bid' would likely have reduced the losses to perhaps \$3 billion, during the periods of supply shortage.

Attachment I

## Thomas Tanton

Mr. Tanton is President of T<sup>2</sup> & Associates, a firm providing consulting services to the energy and technology industries. T<sup>2</sup> & Associates are active primarily in the area of renewable energy and interconnected infrastructures, analyzing and providing advice on their impacts on energy prices, environmental quality and regional economic development. Mr. Tanton is also Director of Science and Technology Assessment with Energy and Environment Legal Institute. Mr. Tanton has 40 years direct and responsible experience in energy technology and legislative interface, having been central to many of the critical legislative changes that enable technology choice and economic development at the state and federal level. Mr. Tanton is a strong proponent of free market environmentalism and consumer choice, and frequently publishes and speaks against alarmist and reactionary policies and government failures.

As the General Manager at EPRI, from 2000 to 2003, Mr. Tanton was responsible for the overall management and direction of collaborative research and development programs in electric generation technologies, integrating technology, market infrastructure, and public policy. From 2003 through 2007, Mr. Tanton was Senior Fellow and Vice President of the Houston based Institute for Energy Research. Mr. Tanton was also a Senior Fellow in Energy Studies with the Pacific Research Institute until 2010. Until 2000, Mr. Tanton was the Principal Policy Advisor with the California Energy Commission (CEC) in Sacramento, California. He began his career there in 1976. He developed and implemented policies and legislation on energy issues of importance to California, and U.S. and International markets, including electric restructuring, gasoline and natural gas supply and pricing, energy facility siting and permitting, environmental issues, power plant siting, technology development, and transportation. Mr. Tanton completed the first assessment of environmental externalities used in regulatory settings. Mr. Tanton held primary responsibility for comparative economic analysis, environmental assessment of new technologies, and the evaluation of alternatives under state and federal environmental law. Mr. Tanton had oversight responsibilities for electricity and transportation technology development. Mr. Tanton served as Guest Lecturer for the Master in Environmental Science program at California State University Sacramento (CSUS), lecturing on power plant and electric grid technologies and their comparative environmental impacts.

Attachment 2

Hidden Cost of Wind Electricity

(Executive Summary Only, full report at <http://eelegal.org/wp-content/uploads/2013/09/Hidden-Cost.pdf>)

## Executive Summary

The cost of the second most rapidly-growing choice -- wind electricity -- has been vastly understated. If six missing factors were taken into account, wind electricity would be nearly twice as expensive as the Energy Information Administration reported in its most recent Annual Energy Outlook [1]

1. An implicit subsidy
2. An optimistic assumption about the operating life of wind facilities
3. The capital and operations & maintenance costs of primary plants
4. Fuel consumption
5. Transmission
6. Transmission losses

The missing costs are not difficult to understand. They just have not been counted because wind electricity is so different from traditional sources.

The bottom line is that the cost of wind electricity is nowhere near parity today with the cost of coal, natural gas or nuclear electricity; and would not break even with gas-fired electricity unless the delivered price of natural gas were 5 times higher than today's price.

While wind energy advocates have often claimed that wind will soon be competitive:

“The best wind farms in the world already produce power as economically as coal, gas or nuclear; the average wind farm will be fully competitive by 2016.”  
*Bloomberg New Energy Finance, November 10, 2011 [2]*

The only way to reach such a conclusion is by ignoring some costs and socializing others.

Reports such as Bloomberg's press release and the Energy Information Administration (EIA)'s 2012 Annual Energy Outlook have not only failed to count all the costs of wind generation, but have failed to explain how wind works. It cannot operate by itself, but can operate only as an appendage to some primary source such as natural gas, coal or hydro. And since its only benefit is to supply energy but no capacity, part of its cost includes maintaining the availability of whatever source it's combined with. Which means that, unlike all conventional sources, there is not just one cost for wind electricity, there is a different cost for each type of primary source that it's combined with.

Table 1 summarizes how the six factors we examine in this report would increase the estimated cost of wind electricity from the 8 cents per kilowatt-hour that EIA reported to at

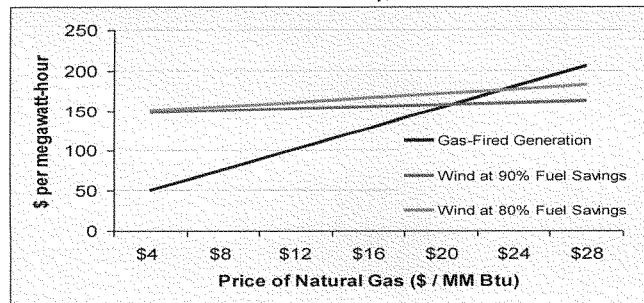
least 15 cents/kWh if wind were combined with natural gas and 19 cents/kWh if wind were combined with coal.

Table 1. Levelized Cost of Wind Electricity, (starting from the assumptions in the Energy Information Administration's 2012 Annual Energy Outlook)		Onshore Wind Added to Natural Gas (c / kWh)	Onshore Wind Added to Coal (c / kWh)
As reported by EIA, but using more recent (lower) wind turbine prices		8.2	8.2
① ② Backing out an implicit subsidy, and assuming a 20-year lifetime		10.1	10.1
③ Plus the cost of keeping primary fossil plants available		11.8	15.6
④ Plus the extra fuel that fossil plants are forced to consume		12.4	16.5
⑤ ⑥ Plus estimated costs for transmission and transmission losses, as wind penetration increases from today's levels		15.1	19.2
Using higher published estimates for the cost of wind operations and maintenance		16.1	20.2

#### The Breakeven Price of Natural Gas

Figure 1 shows that wind electricity would not reach breakeven with gas-fired electricity unless the delivered price of natural gas were about \$20 per million Btu if wind were 90% effective at saving natural gas, or about \$23 per million Btu if wind were 80% effective at saving natural gas<sup>7</sup>. At either point, both wind and gas generation would be far more expensive than nuclear generation, and perhaps more expensive than coal with carbon capture and storage.

Figure 1. The Costs of Wind versus Gas-Fired Electricity, Relative to the Price of Natural Gas



<sup>7</sup> The average delivered price of natural gas was about \$5 per million Btu from 2009-2011 and \$4 per million Btu in 2012 [6].

### What Policymakers Need To Know About Wind Electricity

- That since wind generation reduces the average level of generation of the primary fossil plants, but does not reduce the need for keeping those plants in operation, part of wind's cost must be to pay for the costs of capital, operations and maintenance of those plants.

Levelized costs do not correlate with estimates of the wholesale price of electricity. They are designed to enable reasonable comparisons between the costs of various options over the life of facilities. Levelized costs reflect the present net value of the total cost of constructing, maintaining and operating an electricity generation plant over its lifetime, expressed in terms of dollars per unit of output. Levelized cost comparisons are an artifact of the regulated monopoly paradigm, where all costs of power and energy, transmission and operations were incurred by the utility and no costs were hidden by off-loading to others or to society as a whole.

- Since wind generation also imposes inefficiencies on those primary fossil plants, and requires additional reserves in order to maintain system reliability, **wind cannot save 100% of the fuel that would otherwise have been consumed.** This shortfall has not been counted in most cost of electricity tables, although it has been reported as a "cost of intermittency" in studies on the cost of wind integration.
- Because its best locations are remote from major cities, **wind requires new long-distance transmission lines** which are much longer than before, and would not be necessary today, except to support wind. For every other type of generation except hydro, it has always been less expensive to move the fuel than to move the electricity. Consequently, nearly all traditional generation facilities have been built closer to major cities.
- Even cost studies which claim to have excluded subsidies typically still contain a special accelerated-depreciation subsidy for wind, solar and biomass.
- **Over \$200 billion is at stake.** The state-level mandates and federal subsidies which are driving the current wind boom had already cost \$120 billion through mid-2012, even before counting the cost of new transmission. Fulfilling the mandates in their entirety would cost about \$200 billion more (plus transmission).
- **Wind's cost per kilowatt-hour will grow larger over time,** because while early wind installations could piggyback on spare capacity in the system, further deployment will increasingly require new infrastructure.
- **Some of the most crucial information about the cost of wind electricity has not been reported.** Given that the nearly all of wind's value is the amount of fossil fuel it can save, and that without this number, the avoided cost that wind facilities must be paid under the terms of the Public Utility Regulatory Policy Act (PURPA) cannot be calculated accurately, it's astonishing that no regulatory authority has reported how much fuel wind has saved, based on real-world experience.

To enable independent evaluation of wind's full cost, regulators need to begin reporting for each region or grid-balancing area:

1. how much fossil fuel wind has saved, and how that changes with different levels of wind
2. the cost of transmission that has been added to support it, and associated transmission losses
3. aggregate wind generation on a fine-grained time scale, and
4. wind's measured capacity factor.

None of this information should be proprietary or difficult to calculate to a reasonable degree of accuracy. But it needs to be reported so that the public will know the real costs of expanding wind generation.

Attachment 3

State Level Renewable Portfolio Standards Economic Cost Studies with Links

May 2011: [Study of the Effects of Delaware's Renewable Portfolio Standard on the State Economy](#)

April 2011: [Study of the Effects of Minnesota's Renewable Portfolio Standard on the State Economy](#)

April 2011: [Study of the Effects of Ohio's Alternative Energy Portfolio Standard on the State Economy](#)

February 2011: [Study of the Effects of New Mexico's Renewable Portfolio Standard on the State Economy](#)

February 2011: [Study of the Effects of Colorado's Renewable Portfolio Standard on the State Economy](#)

January 2011: [Study of the Effects of Montana's Renewable Portfolio Standard on the State Economy](#)

Attachment 4

An Estimate of the Economic Impact of A Cap-and-Trade Auction Tax On California  
(Executive Summary Only; full report available upon request)



**An Estimate of the Economic Impact of  
A Cap and Trade Auction Tax  
On California**

Thomas Tanton  
Principal  
T<sup>2</sup> & Associates  
March, 2010  
For  
AB 32 Implementation Group



## Summary

We have estimated the following impacts:

- An annual effective cost increase to the typical family of four to be \$818 the first year growing to \$2800 in 2020, if market clearing prices for permits are \$60 dollars per ton. Those figures are \$270 and \$930 if permit prices are at \$20 and as much as \$2720 to over \$9330 per family if prices clear at \$200 per ton. Costs increase for most goods and services. These cost increases are average for the population, although some residents may be compensated through a partial return of auction revenues.
- Annual job losses to the California Economy of 76,000 to 107,000 the first year growing to perhaps 485,000 jobs in 2020, assuming a market clearing price of \$60 per ton. These are net jobs losses, accounting for lost jobs and for jobs created by redirecting revenues collected from the auctions.
- Lost economic activity of nearly 2% of gross state product, or about \$250 to 350 billion over ten years. Much of this derives from reductions in productivity across the economy, and negative trade implications due to reduced competitiveness.

Table 1  
Summary Findings of Net Impact

Year and Permit Clearing Price	Impact on Family	Jobs Lost
2012 @\$60	\$818	76,000-107,000
@\$20	\$270	25,500-35,700
@\$200	\$2720	255,000
2020 @\$60	\$2800	485,000
@\$20	\$930	162,000
@\$200	\$9330	1,617,000

There is uncertainty about how auction revenues would be re-distributed in the economy. To the extent the revenue is captured in a special fund under the control of CARB, the legislature would have limited state budget authority and flexibility. This is a significant concern given the potentially large amount of revenue (collecting in 8 years, fully 120% of the single year 2009/2010 state budget<sup>8</sup>) to be raised by an auction tax.

<sup>8</sup> Assuming collection of revenues at auction price of \$60/ton would total \$143 billion, compared to California state 2009/10 budget total of \$119.2 billion, as documented at <http://www.osp.dgs.ca.gov/On-Line+Publications/FinalBudgetSummary.htm>

Mr. WHITFIELD. Thank you very much, Mr. Tanton. We appreciate that, and there are those lights on the front that—on red to indicate your time is up, but we won't cut you off immediately, but I—we really appreciate your testimony.

Our next witness is Mr. Fred Siegel, who is Senior Fellow at the Manhattan Institute, and scholar and resident at Saint Francis College.

Mr. Siegel, thanks for joining us, and you are recognized for 5 minutes. And be sure to turn your microphone on and get it close. I think you might need to just push that button to turn it on.

#### STATEMENT OF FRED SIEGEL

Mr. SIEGEL. This one. Is this working now? Yes, OK.

Thank you for having me. Unlike the other members of this panel, I am not an energy expert. I am an historian. I have written about laboratories of democracy in a book I wrote about Los Angeles, New York and Washington, DC, and more recently, in a book I wrote about American liberalism, why it is misunderstood, in a book entitled, *Revolt Against the Masses*, which received positive reviews in every single magazine and newspaper except the New York Times.

The transformation of American liberalism over the last half century is outlined and disputes rolling and out-of-the-way place in upstate New York. The southern tier of New York is little-known. Tioga, Chemung, Broome Counties are not household names, but they are areas which are gone—have gone terribly. The total employment in the Binghamton metro area is less than it was in 2001. The other nearby city of sorts is Elmira. It too has a smaller workforce than it had in 2001. And if you were to drive through there, you would find it looks like Appalachia, and indeed it was. When the Appalachian Commission was created by the Great Society, an earlier failed program of liberal policy, these southern tier counties were included, and they still are. There are several Appalachian Commission offices scattered across the southern tier. New York is not good at economic growth; it is very good at creating commissions and authorities.

In 2008, it looked like something might be done. It looked like the broken-down barn houses and people selling their land for taxes, because New York taxes—property taxes are among the highest in the country, might be coming to an end because it looked as if the fracking boom, which had hit Pennsylvania, right across the border, in Pennsylvania it is called the northern tier, in New York it is called the southern tier, of counties were bringing jobs to Pennsylvania.

And let me just read from Ed Rendell, former Democratic Governor of Pennsylvania. Thousands of solid jobs with good salaries were created in Pennsylvania. Communities came back to life, and investment in the State soared. The steel, lumber, concrete, and construction industries, as well as manufacturing, purchasing, and retail spending, all boomed because of fracking on the Pennsylvania side.

Now, part of the difference is Pennsylvania has a long history of energy extraction, New York does not, but there are others. Thirty-two States now accept fracking. New York is still studying the

issue. The only State that has banned fracking is Vermont, which has no shale beneath its surface. So it is—as with so many other things in Vermont, it is meaningless.

In 2010, a new Governor came into office, Mario—excuse me, Andrew Cuomo. I am old enough to remember Mario. Andrew Cuomo came into office and he proposed—he floated what seemed like a genuinely intelligent compromise. In places where gentry liberals live, like Ithaca, home or Cornell, or Cooperstown, where many well-to-do retirees reside, there would be no fracking. In areas where there was a watershed for either New York or Syracuse, there would be no fracking. Fracking would be confined to the southern tier of the southern tier, to the most adversely affected counties in New York, and that is all. It seemed like a reasonable compromise. However, opposition to fracking had become totemized. The support of fracking was to be—was to align yourself with the spawn of the devil. If that sounds excessive, no, I am describing conversations I have had with anti-frackers in New York City at rallies. Fracking is inherently evil. I am told by anti-frackers that it is fracking that creates poverty in Pennsylvania, which is a fascinating idea. It is a bit like saying Israeli rockets are what is creating the rockets coming out of Gaza. It gets everything exactly backwards.

That compromise proposal we have only applied to the counties in New York State, like Chenango, Steuben, and Tioga, the southern tier of the southern tier, where there were no aquifers, where the soil is poor, and where there is desperate poverty.

What is going on—and this is when I got interested in this. I am not a person who studies energy. I was fascinated at the rejection, the flat-out, aggressive rejection of a reasonable compromise. And what I discovered was, in part, it was a matter of practical interest. People like Yoko Ono, I don't know how you would describe—

Mr. WHITFIELD. Mr. Siegel, excuse me for interrupting—

Mr. SIEGEL. Sure.

Mr. WHITFIELD [continuing]. But I just wanted to say that you are about 30 seconds over your 5 minutes, so—

Mr. SIEGEL. In that case—

Mr. WHITFIELD [continuing]. If you—

Mr. SIEGEL [continuing]. I will conclude in 30 seconds.

Mr. WHITFIELD. OK.

Mr. SIEGEL. Sorry, I didn't realize I was—it was taking so long.

The issue of fracking turns out to be a class issue. Upper middle-class liberals are vehemently opposed in the name of preserving New York as something like a Currier and Ives photo; wonderful, beautiful place to retire, but not a place to grow—and the anti-frackers insist that they want to maintain New York as this kind of museum preserve. The pro-frackers are mostly practical people who want to get out of debt.

Mr. WHITFIELD. Yes.

Mr. SIEGEL. That class divide explains fracking in New York.

[The prepared statement of Mr. Siegel follows:]

## Testimony

July 24, 2014

---

### *Cities As Laboratories Of Democracy*

Testimony by Fred Siegel, Senior Fellow

It is an honor to testify before the House subcommittee on Energy and Power before the distinguished members of Congress. And it's an honor to be on a panel with so many knowledgeable experts on energy policy.

I am not an expert on energy but an historian well acquainted with the concept of Laboratories of Democracy. My 1996 book *The Future Once Happened Here: New York, D.C., L.A., and the Fate of America's Big Cities* compared the economic and social policies of three great cities. More recently, this past January I published *The Revolt Against the Masses*, which rewrites the history of American liberalism.

The transformation of American liberalism over the past half-century is limned in the disputes roiling an out of the way area of upstate New York. In 1965, as part of his "war on poverty," President Lyndon Johnson created The Appalachian Regional Commission. Included among the areas to be served by the commission were the Southern Tier counties of New York State including Broome, Tioga, and Chemung. Its central aim was to "Increase job opportunities and per capita income in Appalachia to reach parity with the nation." Like so many Great Society anti-poverty programs, it largely failed. "The very images" of collapsing barns and broken down farmhouses that once inspired the Great Society, are commonplace today in New York's Southern tier of counties.

Campaigning for Governor in 2006, Eliot Spitzer, a provincial Manhattanite traveling across upstate New York, declaimed that the upstate economy... "is devastated. It looks like Appalachia. This is not the New York we dream of." Clearly shocked by what he had seen, the liberal Spitzer insisted, "We have to deal with the population loss, with the continual decline."

Neither Spitzer, nor his successors David Patterson and (now) Andrew Cuomo have dealt with the decline.

In the Southern tier of New York counties, best suited for fracking, employment in the Binghamton metro area of Broome county, notes the Empire Center's E.J. McMahon, has declined for six consecutive years and is now 12 percent below its 2001 level.

To the West, employment in the Elmira metro area in Chemung County is also 12 percent below its 2001 level. Elmira, however, had a brief growth spurt thanks to the growth of fracking in nearby neighboring Pennsylvania.

Upstate, once a counterweight to the New York metro area, is increasingly being brought down by it. “Basically what you’ve got there is a tax code and regulatory regimen written for New York City,” says Joseph Henchman, vice president for state projects at the Tax Foundation in Washington. “Legislators say, ‘Look, New York is a world center of commerce. Businesses have to be here. It doesn’t matter how high we tax them.’ I hear that a lot. But when you apply that same logic to Upstate, the impact is devastating.”

Albany’s ability to tax and spend is, notes William Tucker, legendary. Strict election laws insulate incumbents of both parties, making the state legislature the longest tenured in the nation. Petitions to put an insurgent candidate on the ballot require tens of thousands of signatures and are routinely defeated in the courts. Ballot initiatives that have led to tax reform in other states are also forbidden. The result is a who-can-spend-the-most political mentality unmatched anywhere, except perhaps in Washington.

In the period from 2006 to 2008, the arrival of natural gas drilling seemed to provide a way out of poverty for the Twin Tiers of Southern New York and northern Pennsylvania

In Pennsylvania, explained former Governor Ed Rendell, a Democrat, “Thousands of solid jobs with good salaries were created, communities came back to life and investment in the state soared. The steel, lumber, concrete and construction industries, as well as manufacturing purchases and retail spending, all benefited from the ensuing natural gas boom.”

But while Pennsylvania—a state that had a long history of energy extraction—adopted fracking, where it became an import source of employment and reindustrialization, in New York legitimate environmental concerns held up the expansion of energy extraction. In 2008, the state began studying the issue; even though 32 states now have fracking, New York is still “studying the issue”.

In 2010, a compromise solution to the problem of fracking was floated. Fracking would be banned in the areas near the reservoirs for New York and Syracuse. The 100 towns that had passed local bans on fracking would have their wishes respected; fracking would be kept out of the gentry liberal territory of Ithaca and Cooperstown. The compromise would have confined fracking areas to sections of the Southern Tier Counties of Broome, Chemung, Chenango, Steuben, and Tioga. They were areas where, because the shale was deep within the earth and there are no aquifers threatened, the water tables could, with near certainty, be protected from fracking chemicals.

This might have been a reasonable compromise. The state’s Health Department found, in an analysis it prepared early last year, that the much-debated drilling technology known as hydro-fracking could be conducted safely in New York, according to a copy obtained by *The New York Times* from an expert who did not believe it should be kept secret. But the anti-frackers who had

demonized the gas industry responded with a resounding no to compromise. They were little concern with alleviating the terrible poverty of the Southern tier.

In New York political support for fracking came largely from southern tier landowners scratching out a living on land, much of which has been left fallow. They sometimes referred to the environmental benefits of natural gas as opposed to coal, but the core of their argument was that fracking was the only chance to rescue a dying region where many of the landowners were being crushed by the heavy burden of New York's high taxes—among the very highest property taxes in the nation—and heavy regulation which made it hard to eke out a living from small dairy herds.

The anti-fracking coalition drew on the well-to-do and celebrities whose primary home was in Gotham, but who also owned a second homes upstate such as Yoko Ono, and Richard Plunz of the Columbia School of Architecture. It was also supported by the Rockefeller funded NRDC, which has tried to keep upstate a preserve for the summer homes of its wealthy supporters. They are joined by the ironically named “progressives,” often from Manhattan, who brought vehemence to the fray.

And while Gotham's liberal gentry speak of fracking as the spawn of the devil, they're barely aware of their dependence on natural gas.

The meatpacking district of New York has become a magnet in the past decade, home to boutiques, hotels, and the popular High Line elevated park. On November 1, it will become a different sort of destination. The city's first major natural gas transmission pipeline in 40 years will terminate there, right next to the Renzo Piano-designed art museum under construction.

Dick Downey of Otego New York, a former history teacher and a supporter of fracking, notes that “the class divide in the argument over drilling in New York is the elephant in the living room. Everyone's aware of it, but no one is talking about it.” It pits generational farmers against the newly arrived, well-to-do pensioners against those just hanging on. But if the class dimension is clear to many of the pro-frackers I spoke with, the same is not true of anti-frackers I interviewed.

“What really makes the blood boil,” said one well educated pro-fracker “is the elitist tinge to their conversation. . . that we knuckle draggers just don't get it, because we don't want farmers to have to sell off parcels of their land to pay their taxes.” Some muse about how Cornell is worried that if fracking came to nearby Tioga county, it would upset the local social order if people who worked for Cornell in a service capacity were to become wealthier than the faculty who view themselves as lords of the manor. Others suggest that the anti-frackers don't want to see Republican areas, like fallow lands of the Southern Tier, enriched for fear of the political impact. But such sentiments miss the fact that, by and large, with the exception of those who produce artisanal cheeses, organic garlic, and high end woodwork, Ithacans pay scant attention to the rural people surrounding them.

The anti-fracking movement has taken on something of the anti-industrial Tory ethos of mid-19th century England. The romantic sentiments underlying the anti-fracking movement have

been expressed by Adelaide Gomer, the Duncan Hines heiress, who directs the Park Foundation of Ithaca that finances much of the anti-fracking movement. "Hydro-fracking," she wrote in a petition "will turn our area into an industrial site. It will ruin the ambience, the beauty of the region. But, moreover it will poison our aquifers. We can live without gas, but we cannot live without water." The pro-frackers share the concern of preserving the water supply. They are, in the classical sense, conservationists. The anti-frackers want to maintain upstate as a pristine setting for tourism and gracious living. The two, it would seem, are in principle reconcilable. But whereas the British Tories felt a paternal obligation to look after the well-being of the peasants they governed, today's liberal gentry operates on a self-interested basis.

When pushed to discuss the poverty of the Southern tier, gentry liberals make it clear that their liberalism is very different from the ideology of the same name that created the Great Society. I was told that "people move into rural New York for the higher welfare benefits," and that the people living in broken down trailers had "big screen TVs and cell phones. "I was told they're lazy people waiting to have pixie dust sprinkled on them" or that they felt entitled to a winning lottery ticket, or that the call for fracking comes from failed farmers, or that poverty is a long term and global problem, while fracking can only bring in money for a few years. Similarly, I was told that it was fracking that had brought poverty to Northern Pennsylvania.

Part of the difference between the Southern Tier, with its university towns and high level of government employment, compared to the Keystone state's northern tier, is that the Pennsylvania Northern Tier's critics of fracking lacked an ideology. In the case of the New Yorkers, the leading anti-frackers, such as Sandra Steingraber of Ithaca College, are well-developed critics of industrialism. Pennsylvania generally wanted the new manufacturing made possible by cheap energy; the New Yorkers dreaded it.

Normally jobs and revenue are a winning combination, but not in a state where environmental policy is driven by gentry liberals with jobs in Gotham and summer homes in an upstate they'd liked to preserve as a vision from Currier and Ives.

Mr. WHITFIELD. Thank you, Mr. Siegel.

At this time, our next witness is Mr. Steve Clemmer, who is the Director of Energy Research and Analysis for Climate and Energy Program at the Union of Concerned Scientists.

Mr. Clemmer, welcome, and we look forward to your testimony. And you are recognized for 5 minutes.

#### STATEMENT OF STEVE CLEMMER

Mr. CLEMMER. Good morning. On behalf of UCS and our 450,000 members and supporters, I would like to thank Chairman Whitfield and the other distinguished members of the subcommittee for the opportunity to testify today.

My comments are—will focus on how State renewable electricity standards have been a key driver for the recent growth in the U.S. wind and solar industries, spurring innovation and creating new jobs and income for State and local economies. I will also show how utilities in most States are meeting or exceeding their targets at little to no cost to consumers. Finally, I will highlight how stronger Federal policies are needed to complement State renewable policies.

I am going to try not to repeat some of the excellent comments that both Mr. Rush and Mr. Waxman already made about these policies that are included in here in my testimony.

So a renewable electricity standard requires electricity—electric utilities to gradually increase the amount of renewable energy in their power supplies over time. As we heard, there are 29 States and the District of Columbia that have standards. Seventeen States and DC have renewable standards of 20 percent or more, and 18 States have increased or accelerated their targets since they originally adopted them. Lawrence Berkeley National Lab estimates that 46,000 megawatts, or more than  $\frac{2}{3}$  of all the renewable capacity installed since 1998, occurred in the States with renewable standards. They project this amount to more than double to 94,000 megawatts by 2035 as the States continue to ramp up their standards. California's 33 percent by 2020 standard creates the Nation's largest market for renewable energy, followed by Illinois, New Jersey, Texas and Minnesota.

State renewable standards, combined with the Federal tax credits, have played a key role in the rapid growth of the U.S. wind and solar industries, as we have heard. Wind power accounted for nearly  $\frac{1}{3}$  of all new electric generating capacity in the U.S. over the last 5 years, second only to natural gas, and 9 of the top 10 States in total installed wind capacity have renewable standards. Meanwhile, the solar capacity has increased by a factor of 10 since 2009, and a record 5,000 megawatts of solar was installed in the U.S. last year. All of the top 10 States with the highest installed solar PV capacity have renewable standards.

So we heard earlier some of the economic benefits that this is delivering in terms of 50,000 jobs in the wind industry, \$100 billion of investment in the U.S. economy since 2007, just in wind alone. Texas is the leader with both installed wind capacity, but also the most amount of wind jobs, followed by Iowa, California, Illinois, Colorado, Kansas, Michigan, North Dakota, Oregon and New York. All of these States but one have renewable standards. You heard



about the domestic manufacturing of wind turbine components that has also increased dramatically over the last 5 years as the renewable standards have ramped up. The domestically sourced content of U.S. wind projects has—installed today is over 70 percent, up from less than 25 percent in 2005. Wind power is also providing significant income and tax revenues for rural communities. For example, in Iowa, which now generates 27 percent of its electricity with wind, wind projects provided \$16 million in annual lease payments to landowners, and nearly \$20 million in annual property tax payments.

The solar industry has invested about \$34 billion in the U.S. economy over the past 3 years, and as we heard earlier, there is about 142,000 people that work in the U.S. solar industry at 6,100 businesses. While California leads the Nation with about  $\frac{1}{3}$  of those jobs, States in the Midwest, northeast, southeast and southwest are also in the top 10.

The other positive news has been that renewable standards have been a key driver for technology innovation and cost reductions. Since 2009, the cost of generating electricity from wind has fallen 43 percent. The average price of a solar PV panel has declined 60 percent.

Renewable standards are also a good deal for consumers. The falling cost of wind and solar have allowed most utilities to fully comply with their standards at little to no cost to consumers. In May, NREL and LBNL released a comprehensive of State RPS costs and benefits based primarily on data from utilities and State regulators. The study found that between 2010 and 2012, the cost of complying with the renewable standards in 25 States ranged from a net savings of .2 percent of retail rates, to a net cost of 3.8 percent. This is considerably lower than the Beacon Hill Institute's studies that Mr. Tanton mentions in his testimony. UCS and several other groups have identified serious flaws in these studies funded by the fossil fuel industry that lead to highly exaggerated costs. And I would be happy to talk about that in the Q and A if you want me to.

I can wrap up with about 30 seconds on the Federal policy angle. So while Federal tax credits have been an important compliment to State renewable standards, the inconsistent support from Congress has created significant market uncertainty. To eliminate the uncertainty, UCS recommends that Congress extend the PTC by at least 4 years, and transition to more stable long-term policies. We also recommend allowing renewable energy technologies to be eligible for master limited partnerships and other innovated financing mechanisms to provide parity in the tax code with fossil fuels.

Finally, let me say that, as Mr. Waxman mentioned with EPA's proposed carbon standards, this provides a really important opportunity to increase renewable energy use and reduce carbon emissions. We believe that EPA's proposed building blocks for existing plants is a flexible and cost-effective framework to help States meet their proposal. OK.

Mr. WHITFIELD. So if you will conclude.

Mr. CLEMMER. Yes, so my last statement is just that UCS believes that EPA can go much further. We did an analysis that shows they can achieve twice the level of emission reductions—

Mr. WHITFIELD. Yes.

Mr. CLEMMER [continuing]. And twice the level of——

Mr. WHITFIELD. All right.

Mr. CLEMMER [continuing]. Renewables at a net savings to consumers.

So I will conclude there.

[The prepared statement of Mr. Clemmer follows:]

**Renewable Electricity Standards:  
Delivering Significant Economic Benefits Across the United States**

**Testimony of Steve Clemmer  
Director of Energy Research and Analysis  
Climate & Energy Program  
Union of Concerned Scientists**

**Before the  
Subcommittee on Energy and Power  
Committee on Energy and Commerce  
U.S. House of Representatives  
Hearing on “Laboratories of Democracy: The Economic Impacts of State Energy Policies”  
July 24, 2014**

**SUMMARY OF UCS TESTIMONY**

- State renewable electricity standards (RES) adopted by 29 states and the District of Columbia have been a key driver of renewable energy development, representing more than two-thirds of all non-hydro renewable energy capacity installed in the U.S. between 1998 and 2012.
- Seventeen states and D.C. have renewable standards of more than 20 percent. California's 33 percent by 2020 standard creates the nation's largest market for renewable energy, followed by Illinois, New Jersey, Texas, and Minnesota.
- RES policies are creating jobs and delivering investments, income, and tax revenues to state and local economies. The U.S. wind industry has invested over \$100 billion in the U.S. since 2007 and supports 50,500 direct jobs. More than 560 facilities in 43 states manufacture wind turbine components that have increased the domestic content of U.S. wind projects from less than 25 percent in 2005 to over 70 percent in 2012. Nine of the top 10 states in total installed wind capacity have RES policies (TX, CA, IA, IL, OR, OK, MN, KS, WA, CO).
- The U.S. solar industry has invested nearly \$34 billion in the U.S. economy over the past three years, and supports more than 142,000 jobs at 6,100 businesses located in every state. All of the top 10 states in total installed solar photovoltaic (PV) capacity have RES policies (CA, AZ, NJ, NC, NV, MA, HI, CO, NY, NM).
- The falling costs of wind and solar have allowed most utilities to fully comply with state RESs at little to no cost to consumers, and in some cases net savings.
- Stronger federal policies are needed to complement state RESs, such as extending federal tax credits, allowing renewables to be eligible for lower cost financing such as Master Limited Partnerships, adopting a national RES of 25 percent by 2025, and increasing the contribution of renewable energy to achieve stronger power plant carbon standards.

On behalf of the Union of Concerned Scientists (UCS), I would like to thank Chairman Whitfield, Ranking Member Rush, and the other distinguished members of the Subcommittee for the opportunity to testify today. My name is Steve Clemmer. I am the Director of Energy Research and Analysis for UCS' Climate and Energy Program. UCS is the nation's leading science-based nonprofit organization with more than 450,000 members and supporters. We put rigorous, independent science to work to solve our planet's most pressing problems. Our Climate and Energy Program focuses on developing a sustainable and affordable energy system—one that does not degrade natural systems or public health. UCS has been a leading advocate of increasing renewable energy use at the state and national levels for many years.

My comments today will focus on how renewable electricity standards have been an effective and affordable state policy that have delivered significant economic benefits across the United States, as discussed in more detail in a recent UCS report (UCS 2013a). I will describe how they have been a key driver for the recent growth in the U.S. wind and solar industries spurring innovation and creating new jobs, income, and tax revenues for local communities. I will also show how utilities in most states are meeting or exceeding their targets at little to no cost to consumers. Finally, I will highlight how stronger federal policies are needed to complement state renewable energy policies.

#### **A Primary Driver of Renewable Energy**

A renewable electricity standard (RES) requires electric utilities to gradually increase the amount of renewable energy in their power supplies over time. It uses a market-based approach that stimulates competition among renewable energy developers and multiple technologies to provide the greatest amount of clean power for the lowest price, and an ongoing incentive to drive down costs. It requires minimal government involvement in setting the targets and

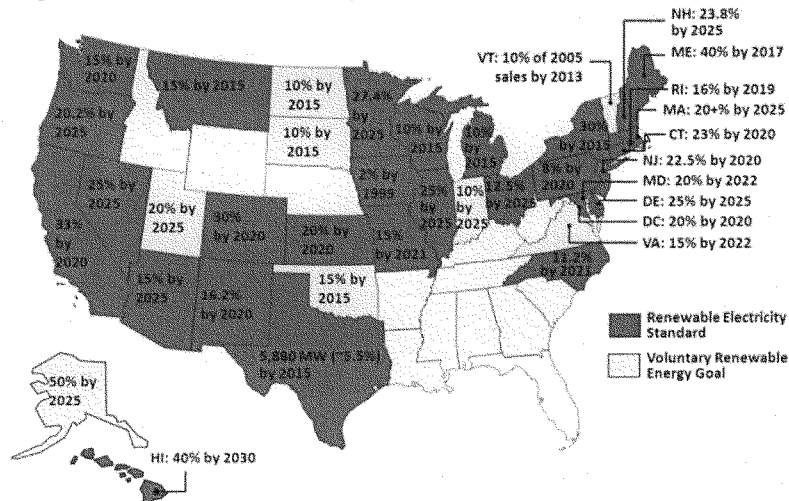
verifying compliance, while the market decides which renewable energy technologies and companies win or lose based on cost and performance. An RES also represents a way to value the environmental and other important public benefits of renewable energy that are currently not priced in energy markets, providing a more level playing field to compete with the more mature fossil fuel and nuclear industries.

State RESs have enjoyed strong bi-partisan support since they began in the late 1990s. To date, RESs have been adopted in 29 states and the District of Columbia, and another 8 states have adopted voluntary goals (Figure 1). Of the 37 states with standards or goals, 22 were enacted by states with mixed party control of the House, Senate, or Governor's office (Governor's Wind Energy Coalition, 2013). While the remaining 15 were enacted in states with single-party control, they were split evenly with eight all-Democrat and seven all-Republican control. And 20 RESs were adopted in states with Republican governors at the time, including in 1999 when President Bush was governor of Texas. A primary reason for the bipartisan nature of the RES is that both Democrats and Republicans alike recognize the jobs and other economic benefits that renewable energy development brings to their state and local economies.

Collectively, renewable standards applied to 55 percent of total U.S. electricity demand in 2012, according to Lawrence Berkeley National Laboratory (Barbose, 2013). LBNL also estimates that 46,000 megawatts (MW)—representing 67 percent of all renewable energy capacity from wind, solar, geothermal, and bioenergy installed in the U.S. between 1998 and 2012—occurred in states with renewable standards. LBNL projects this amount to more than double to 94,000 MW of new renewables by 2035, as states continue to ramp-up their standards. This should be relatively easy to achieve as it will require less than half the renewable capacity installed per year on average in the U.S. since 2008. In addition, four major transmission

projects completed in 2013 in Texas and the West could carry 10,000 MW of new wind capacity, while 15 other near-term transmission projects in advanced stages of development could carry an additional 60,000 MW of wind (AWEA 2014). This clean electricity is sorely needed as the nation's aging fleet of fossil fuel power plants retire.

**Figure 1. State Renewable Electricity Standards**

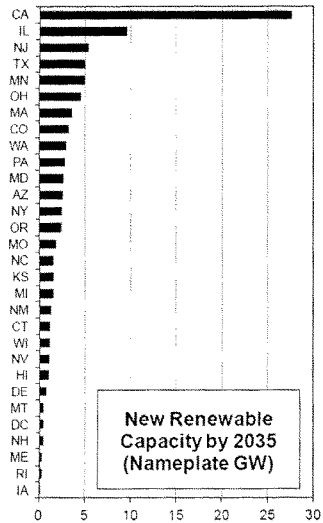


Source: Union of Concerned Scientists

California's 33 percent by 2020 standard creates the nation's largest market for renewable energy, followed by Illinois, New Jersey, Texas, and Minnesota (Figure 2). Hawaii and Maine have the highest renewable energy targets at 40 percent, but because of their small populations and lower electricity demand, the renewable energy markets are smaller than in other states. Seventeen states and D.C. have renewable standards of 20 percent or more, and 18 states have increased or accelerated their targets since originally adopting them. Numerous studies by utilities, regional grid operators, and state and federal agencies have shown that variable

renewable energy sources such as wind and solar can be integrated into the electricity system at similar or higher levels, while maintaining reliable and affordable electricity (UCS 2013b).

**Figure 2. New Renewable Energy Capacity Needed to Meet State RESs in 2035**



Source: Barbose 2013.

#### **RES Policies Deliver Economic Benefits**

The long-term markets created by state RESs, combined with federal tax credits, played a key role in the rapid growth the wind and solar industries have experienced in the United States over the past several years. Nine of the top 10 states in total installed wind capacity have RES policies. Wind power accounted for 88 percent of the state-RES driven renewable energy capacity additions between 1998 and 2012, according to LBNL (Barbose 2013). Wind power has also accounted for 31 percent of all new electric generating capacity over the past five years, and has invested over \$100 billion in the U.S. economy since 2007 (AWEA 2014). The wind

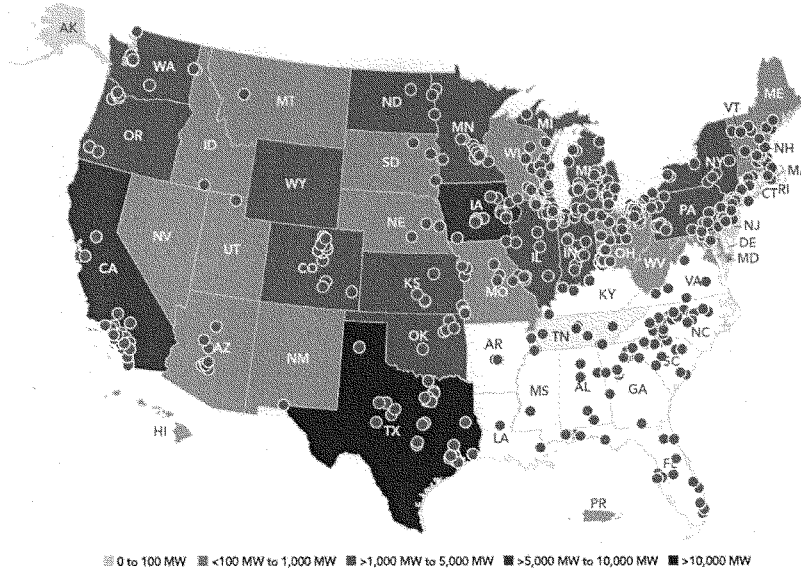


industry broke a record in 2012 by installing more than 13,000 MW, which represented 42 percent of all new U.S. electric capacity additions and a \$25 billion investment in the U.S. economy (AWEA 2014).

At the end of 2013, the U.S. wind industry supported 50,500 direct full-time equivalent jobs in construction, manufacturing, operations, planning, and development (AWEA 2014). Texas, the national leader in installed wind capacity, also has the most wind-related jobs with over 8,000. The rest of the top 10 states for wind jobs include Iowa, California, Illinois, Colorado, Kansas, Michigan, North Dakota, Oregon, and New York, with each state employing between 1,000 and 4,000 people. All of these states have RESs except North Dakota, which has a non-binding goal.

Domestic manufacturing of wind turbine components has also grown significantly as the long-term market certainty provided by state RES policies has ramped up. The domestically sourced content of U.S. wind projects installed in 2012 was over 70 percent, up from less than 25 percent in 2005, and eight of the world's 10 largest wind-turbine manufacturing firms now have facilities in the United States (Wiser and Bolinger 2013). All told, there are now more than 560 facilities employing 17,400 people in 43 states (Figure 3) that manufacture components for the wind industry (AWEA 2014). Many of these facilities are located in states with RESs -- such as the Michigan, Ohio, Illinois, Pennsylvania, Texas, Colorado, and California. However, the markets created by state RESs are also benefitting states that don't have RESs, particularly the Southeast, which is a major wind manufacturing hub with more than 95 facilities.

**Figure 3. U.S. Wind-Related Manufacturing Facilities, 2013**



Source: AWEA 2014.

Wind power is providing a significant source of income for many rural communities. The National Renewable Energy Laboratory (NREL) recently found that wind projects have a county-level annual-earnings impact of \$5,000 to \$43,000 per megawatt of installed wind capacity, depending largely on whether the project has a local-ownership component (DOE 2012). This impact—typically in the form of lease, royalty, or right-of-way payments to local landowners—is becoming an increasingly important revenue stream in the agricultural communities where many wind projects are sited. With over 98 percent of all projects located on private land, wind energy provided an estimated \$180 million annually in lease payments to landowners in 2013 (AWEA 2014). In 2013, wind lease payments exceeded \$38 million in Texas, \$27 million in

California, \$16 million in Iowa, and \$10.9 million in Illinois, while providing \$5-10 million in seven other states (CO, KS, MN, ND, OK, OR, and WA).

State and local governments also collect property and income taxes and other payments from renewable energy project owners. This money is being used by communities to build schools, hospitals, and other important infrastructure. For example, wind projects in Iowa, which now generates more than 27 percent of its electricity with wind, provided more than \$19.5 million in annual property-tax payments to state and local governments in 2011 (AWEA 2011).

State RESs and federal tax credits have also been key drivers for the recent growth in the U.S. solar industry over the past few years. U.S. solar capacity has increased by a factor of ten since 2009 (SEIA 2014). More than 5,000 MW of solar electric capacity was installed in the U.S. in 2013, shattering the previous year's record of 3,300 MW and making solar the second largest source of new capacity behind natural gas.

This development has provided important economic benefits. The solar industry injected \$13.7 billion into the U.S. economy in 2013, and nearly \$34 billion over the past three years (SEIA 2014). More than 142,000 people work in the U.S. solar industry -- a 20 percent increase over 2012 levels -- at 6,100 businesses located in every state (Figure 4). While California leads the nation with over one-third of these jobs, states in the Midwest, Northeast, Southeast, and Southwest are also in the top ten (Figure 5).

All of the top ten states with the highest total installed solar PV capacity in 2013 have RES policies in place (SEIA 2014). The majority of current U.S. solar investments are concentrated in the northeast and western regions of the country, where solar resources are particularly strong or where RES policies have solar-specific targets or other incentives.

Figure 4. U.S. Solar Company Locations

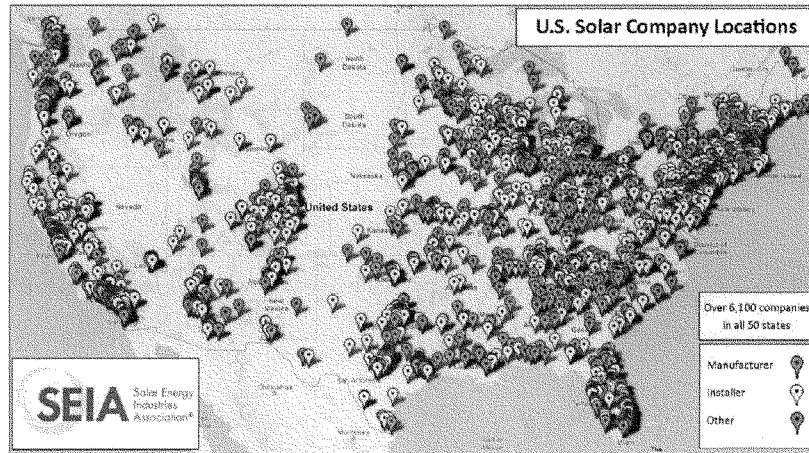
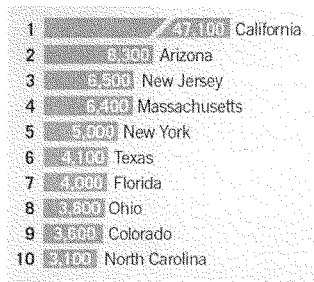


Figure 5. Top 10 States for Solar-Related Jobs



Source: The Solar Foundation, 2014.

#### RES Policies Drive Innovation and Lower Costs

By creating a long-term market for renewable energy, RESs have been a key driver for technology innovation and the recent cost reductions for wind and solar. For example, a recent peer-reviewed study by Carnegie Mellon University that analyzed patenting activity over the past 35 years found that RESs have been a significant driver of innovation in wind power technology

along with R&D, while federal tax credits have been less effective (Horner 2013). Improvements in wind turbine technology, particularly taller towers and longer blades, has also opened up new opportunities to develop wind power in places such as Michigan, Ohio and the Southeast, which were previously considered economically marginal. These improvements are also resulting in greater wind power output, with capacity factors for new wind projects now exceeding 50 percent at the best locations.

Increased domestic manufacturing, combined with increased efficiencies in manufacturing, installing, and operating wind turbines, have led to significant cost declines for U.S. wind projects. The total cost of generating electricity from wind power has dropped 90 percent since 1980, and 43 percent since 2009 (Wiser and Bolinger 2013).

The cost of solar photovoltaics (PV) has also fallen rapidly over the past few years, as the industry has achieved much greater economies of scale in manufacturing and installation. Since the beginning of 2011, the average price of a solar PV panel has declined 60 percent, while the average installed cost has fallen by more than 35 percent (SEIA 2014). The cost of solar PV is already equal to retail electricity rates in 10 states, and this number could more than double over the next year and a half as the costs of solar continue to fall, according to a recent study by Deutsche Bank.

#### **A Good Deal for Consumers**

The falling costs of wind and solar have allowed most utilities to fully comply with state RESs at little to no cost to consumers, and in some cases even net savings. In May, NREL and LBL released a comprehensive peer-reviewed study of state RES costs and benefits, relying primarily on data directly reported by electric utilities and state regulators (Heeter et al. 2014). The study found that between 2010 and 2012, the cost of complying with RESs in 25 states

ranged from a net savings of 0.2 percent of retail electricity sales to a net cost of 3.8 percent (or - \$4 to \$44 per megawatt-hour (MWh) of renewable generation), with a weighted average cost of 0.9 percent. In the most recent year available, most states had compliance costs of less than two percent of retail rates.

They also evaluated several published studies of RES benefits that were conducted at the request of state legislatures, public utility commissions, or other state agencies. This included six studies that quantified the emissions and health benefits of state RES policies, which found benefits ranging from tens to hundreds of millions of dollars per year or approximately \$4 to \$23/MWh of renewable generation. Six other studies examining economic development impacts found benefits on the order of \$1-6 billion or \$22-30/MWh of renewable generation. Six states also quantified wholesale market price suppression benefits ranging from \$2-50/MWh of renewable generation, resulting from low variable cost renewable resources displacing higher priced generation on the margin (usually natural gas) and reducing the market clearing price of electricity. While the study acknowledges that comparing these costs and benefits is challenging, it does show that benefits could offset and potentially exceed the relatively modest costs impacts in many cases.

Diversifying the electricity mix with renewable energy technologies like wind and solar can also help stabilize electricity and natural gas prices. These technologies are not subject to fuel price volatility and can offer fixed prices for 20 years or more. In contrast, natural gas prices, which have experienced significant volatility over the last decade, are difficult to lock-in for any significant duration. A recent LBNL study by comparing prices from a large sample of wind power purchase agreements to a range of long-term natural gas price projections found that wind projects can provide a long-term hedge against natural gas, even in an era of low natural

gas prices (Bolinger 2013). While the recent increase in U.S. shale gas production has resulted in lower natural gas prices, it has not eliminated the price volatility. This was readily apparent last winter during the polar vortex when natural gas and electricity prices reached record high levels in the Northeast and Midwest due to high natural gas demand for both home heating and electricity generation.

#### **Stronger Federal Policies Needed to Complement State RESs**

The Energy Information Administration (EIA) projects that existing state and federal renewable energy policies would increase non-hydro renewable energy sources from more than 6 percent of the U.S. electricity generation in 2013 to 9.4 percent by 2030. Clearly, we can and should do much more to capture the *national* economic, environmental, and energy diversity benefits of renewable energy.

Federal tax credits and R&D funding have been an important complement to state RES policies in promoting renewable energy development, driving technology innovation, and lowering costs. They have also helped create a level playing field for renewables to compete fairly with fossil fuels and nuclear power, which have benefitted from large federal subsidies for decades. However, the production tax credit (PTC) has suffered from inconsistent and short-term support from Congress over the past decade that has created significant market uncertainty and a boom-bust cycle for the wind industry. For example, the most recent expiration of the PTC in January 2013 resulted in significant layoffs in the wind industry. According to AWEA, direct employment in the U.S. wind industry declined from 80,700 FTE direct jobs at the end of 2012 to 50,500 jobs at the end of 2013. This can largely be attributed to the policy uncertainty that led to a 92 percent decrease in new wind capacity installed in the U.S. in 2013. To eliminate this uncertainty and encourage the sustained orderly growth of the industry, UCS recommends

that Congress extend the PTC by at least four years and transition to national policies that provide more stable, long-term support. We also recommend allowing renewable energy technologies to be eligible for Master Limited Partnerships (MLPs), Real Estate Investment Trusts (REITs) and other innovative financing mechanisms to lower the cost of capital and provide parity in the tax code with fossil fuels.

The success of state RESs so far makes a strong case for enhancing them. State governments and Congress should establish RES policies that require electric utilities to procure at least 25 percent of their power from renewable energy sources by 2025. Senator Markey and Senators Mark and Tom Udall both introduced bills (S. 1595 and S. 1627) last year that would achieve these targets. Since 2002, a national RES has passed the Senate three times and the House twice, but has never made it through both houses. UCS and EIA have conducted several national RES analyses over the past 15 years showing that targets of up to 25 percent by 2025 can be achieved affordably, while creating jobs and reducing carbon emissions (UCS 2009, EIA 2009, and EIA 2007). For example, a 2009 UCS analysis showed that by 2025, a 25 percent national RES would result in net increase of more than 200,000 new jobs, \$263 billion in new capital investment, \$64 billion in cumulative savings on consumer electricity and natural gas bills, and a 10.6 percent reduction in power plant carbon emissions.

EPA's proposed carbon standards for new and existing power plants also provides an important opportunity for increasing renewable energy use and reducing carbon emissions. UCS believes that EPA's proposed building block approach for reducing emissions from existing plants provides a flexible and cost-effective framework for states to decide how best to achieve their emission reduction targets. EPA's proposal allowing states to use renewable energy and efficiency for compliance is a smart strategy that builds on the success of what states are already



doing. However, a recent UCS analysis shows that EPA can go much further and achieve about twice the level of emission reductions and renewable energy than included in their proposal at a net savings (Cleetus et al. 2014). Using a modified version of EIA's National Energy Modeling System (NEMS), we found that the U.S. could reduce power plant carbon emissions by nearly 60 percent below 2005 levels, while increasing non-hydro renewables to 25 percent of U.S. electricity sales by 2025. We also found that the annual health and environmental benefits of reducing carbon and other emissions were much larger than the annual compliance costs by a factor of 3:1 in 2020, and 17:1 in 2030. Finally, we found that increasing the contribution from renewables and efficiency to achieving state emission reduction targets could help reduce the economic and climate risks of a potential over-reliance on natural gas (UCS 2013c).

**Conclusion**

State renewable standards are powerful, cost-effective tools for driving significant levels of renewable energy development. In turn, the deployment of wind, solar, and other renewable resources is attracting investments from manufacturers, creating jobs, and producing revenue streams for land owners and local communities, all while providing clean energy that reduces air pollution and helps stabilize our climate. Together with stronger federal policies, state renewable standards can help maintain the nation's momentum toward a clean and prosperous economy.

Thanks again for the opportunity to testify. I'd be happy to answer any questions.

## References

- American Wind Energy Association (AWEA). 2014. *U.S. wind industry annual market report, year ending 2013*. Online at <http://www.awea.org/AnnualMarketReport.aspx?ItemNumber=6258&RDtoken=31647&userID>
- Barbose, G. Lawrence Berkeley National Lab (LBL). 2013. *Renewable portfolio standards in the United States: A status update*. Presented at the 2013 National Summit on RPS, Washington, DC, November 6. Online at [http://emp.lbl.gov/sites/all/files/rps\\_summit\\_nov\\_2013.pdf](http://emp.lbl.gov/sites/all/files/rps_summit_nov_2013.pdf)
- Bolinger, M. 2013. *Revisiting the long-term hedge value of wind power in an era of low natural gas prices*. Berkeley CA: Lawrence Berkeley National Laboratory, Environmental Energy Technologies Division. Online at <http://emp.lbl.gov/sites/all/files/lbnl-6103e.pdf>
- Cleetus, R., S. Clemmer, J. Deyette, and S. Sattler. 2014. *Climate game changer: How a carbon standard can cut power plant emissions in half by 2030*. Cambridge MA: Union of Concerned Scientists. Online at <http://blog.ucsusa.org/cut-power-plant-carbon-by-50-percent-new-epa-climate-rules-real-global-warming-solutions-552>
- Department of Energy (DOE). 2012. *The impact of wind development on county-level income and employment: A Review of Methods and an Empirical Analysis*. Washington, DC: Office of Energy Efficiency and Renewable Energy. Online at [www.nrel.gov/docs/fy12osti/54226.pdf](http://www.nrel.gov/docs/fy12osti/54226.pdf).
- Energy Information Administration (EIA). 2009. *Impacts of a 25-Percent Renewable Electricity Standard as Proposed in the American Clean Energy and Security Act Discussion Draft*. Online at [http://www.eia.gov/analysis/requests/2009/acesa/pdf/sroiaf\(2009\)04.pdf](http://www.eia.gov/analysis/requests/2009/acesa/pdf/sroiaf(2009)04.pdf)
- Energy Information Administration (EIA). 2007. *Energy and Economic Impacts of Implementing Both a 25-Percent Renewable Portfolio Standard and a 25-Percent Renewable Fuel Standard by 2025*. Online at [http://www.eia.gov/analysis/requests/2007/eeim/pdf/sroiaf\(2007\)05.pdf](http://www.eia.gov/analysis/requests/2007/eeim/pdf/sroiaf(2007)05.pdf)
- Governors' Wind Energy Coalition (GWEC). 2013. *Renewable electricity standards: State success stories*. Washington, DC: GWEC. Online at [www.governorswindenergycoalition.org/?p=5145](http://www.governorswindenergycoalition.org/?p=5145).
- Horner, N., I. Azevedo, and D. Hounshell. 2013. Effects of government incentives on wind innovation in the United States. *Environmental Research Letters* 8 (2013) 044032. Online at: <http://iopscience.iop.org/1748-9326/8/4/044032/>
- NREL & LBL. *A survey of state-level cost and benefit estimates of renewable portfolio standards*. May 2014. <http://www.nrel.gov/docs/fy14osti/61042.pdf>

Solar Energy Industries Association (SEIA) and GTM Research. 2014. *Solar market insight report 2013 year in review*. <http://www.seia.org/research-resources/solar-market-insight-report-2013-year-review>

The Solar Foundation. 2014. *National Solar Jobs Census 2013*. Online at <http://www.thesolarfoundation.org/sites/thesolarfoundation.org/files/TSF%20Solar%20Jobs%20Census%202013.pdf>.

Union of Concerned Scientists (UCS). 2013a. *How renewable electricity standards deliver economic benefits*. Cambridge, MA. Online at: [www.ucsusa.org/REShenefits](http://www.ucsusa.org/REShenefits).

Union of Concerned Scientists (UCS). 2013b. *Ramping up renewables*. Online at [www.ucsusa.org/rampinguprenewables](http://www.ucsusa.org/rampinguprenewables).

Union of Concerned Scientists (UCS). 2013c. *Gas ceiling: Assessing the climate risks of an overreliance on natural gas for electricity*. Online at [www.ucsusa.org/gasceiling](http://www.ucsusa.org/gasceiling).

Union of Concerned Scientists (UCS). 2009. *Clean power, green jobs: A national renewable electricity standard will boost the economy and protect the environment*. Online at [http://www.ucsusa.org/clean\\_energy/smart-energy-solutions/increase-renewables/clean-energy-green-jobs.html](http://www.ucsusa.org/clean_energy/smart-energy-solutions/increase-renewables/clean-energy-green-jobs.html).

Wiser, R., and M. Bolinger. 2013. *2012 wind technologies market report*. Washington, DC: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. Online at [www1.eere.energy.gov/wind/pdfs/2012\\_wind\\_technologies\\_market\\_report.pdf](http://www1.eere.energy.gov/wind/pdfs/2012_wind_technologies_market_report.pdf).

Mr. WHITFIELD. Thank you. Our next witness is Mr. Steve Nadel, who is the Executive Director, American Council for an Energy-Efficient Economy.

Thank you for joining us, and you are recognized for 5 minutes.

#### STATEMENT OF STEVEN NADEL

Mr. NADEL. OK, thank you, Mr. Chairman.

Mr. WHITFIELD. And be sure and turn your microphone on, get it close, and—

Mr. NADEL. Thank you, Mr. Chairman, and good morning to all of the committee.

I am the executive director of the American Council for an Energy-Efficient Economy, also known as ACEEE. We are a nonprofit energy efficiency research organization that, since 1980, has acted as a catalyst for energy efficiency policies, programs, technologies and investments. I appreciate the opportunity to testify this morning.

There has been much talk on both sides of the aisle about an all-of-the-above energy policy. ACEEE believes that energy efficiency should be one of the cornerstones of an all-of-the-above energy policy. Energy efficiency is generally our least expensive energy resource, meaning that it often costs less to save a unit of energy, than it costs to produce that same unit of energy. Large cost-effective savings are available in all 50 States. All States are promoting energy efficiency to at least some extent, but some States much more than others. These efforts are helping to create jobs, grow State economies, and produce environmental benefits. Many States are increasing their energy efficiency efforts, but much more is both possible and advantageous.

In my written comments, I first discussed the favorable economics of energy efficiency investments; 2, provide some specific examples of how States are encouraging energy efficiency, particularly some examples of some of the most improved States in our annual energy efficiency scorecard; 3, I discussed the link between energy efficiency and economic development, with examples from specific studies on California, Ohio and the northeast, and, 4, I summarized opportunities to use energy efficiency to create jobs and economic development in all 50 States. In these oral comments, I wanted to concentrate just on economic development; the last 2 issues in my written testimony.

The energy efficiency efforts States make contribute to jobs and economic development in several ways. When money is spent to purchase and install energy efficiency measures, direct, indirect and induced jobs are created. Direct jobs are the jobs to manufacture and install the energy efficiency measures, such as producing and installing insulation. Indirect jobs are generated in the supply chain and supporting industries that are directly impacted by an expenditure or effort. For example, as insulation sales increase, jobs might increase at home improvement stores and trucking firms. Induced jobs are produced as the direct and indirect workers spend their paychecks, such as for eating out or attending a baseball game.

Oil and gas development also spur direct, indirect, and induced jobs, however, energy efficiency investments have 2 other benefits.

First, as consumers and businesses reduce their energy use, they have more income to spend on other goods and services, creating additional jobs. Second, energy efficiency jobs tend to be in construction and services industries, which are both very labor-intensive sectors of the economy. Spending a dollar in construction and services generally provides more jobs than spending a dollar in other sectors of the economy. This is illustrated in Figure 4 of my written testimony.

Several studies have documented these effects at the State level. For example, a 2008 study by an economist at the University of California found that energy efficiency measures have enabled California households to redirect their expenditures towards other goods and services, creating about 1.5 million full-time-equivalent jobs with a total payroll of \$45 billion, driven by well-documented energy savings of \$56 billion from 1972 to 2006. Another example is Ohio. A 2004 analysis that we did with the Ohio Manufacturers Association found that implementing Ohio's energy efficiency savings targets would save consumers nearly \$5.6 billion through 2020, including about \$3.4 billion from reduced customer expenditures on electricity, \$0.9 billion from the impacts of efficiency on wholesale energy prices, and \$1.3 billion from the impact on wholesale capacity markets. Ohio participates in the wholesale energy market of PJM, and under the laws of supply and demand, reduced energy use and peak demand reduces the price of energy and capacity as determined in these markets.

The economic development and other benefits of energy efficiency achieved in these States can all be achieved in other States. This April, we published a State-by-State analysis on how much energy efficiency savings that can be achieved in each State, and the costs and benefits of such investments, as well as the impact on employment and gross State product. The study looked at where each State was, and how much more they could do, with 4 different policies, as discussed in my testimony. Overall, we found that such State efforts could reduce national electricity use by 25 percent by 2030, relative to business-as-usual projections; providing discounted net benefits of about \$48 billion by 2030; increasing GDP by about \$17 billion in 2030; and supporting more than 600,000 net jobs nationally in 2030. State-specific estimates of jobs are provided in Table 2 of my testimony.

In conclusion, States are stepping out and leading energy efficiency efforts. They are creating jobs. Much more is possible in all of the other States, learning from some of the examples featured in my written testimony, such as Mississippi, Oklahoma and Arkansas.

With that, I conclude my testimony.

[The prepared statement of Mr. Nadel follows:]



**Testimony of Steven Nadel**  
**Executive Director**  
**American Council for an Energy-Efficient Economy (ACEEE)**

**To the House Energy and Commerce Committee**  
**Subcommittee on Energy and Power**

**Hearing on:**  
**Laboratories of Democracy:**  
**The Economic Impacts of State Energy Policies**

**July 24, 2014**

**Summary**

States are increasingly taking action to help consumers and businesses reduce their energy use and costs and promote economic development through energy efficiency. In this testimony I will

- discuss the favorable economics of energy efficiency investments;
- provide some specific examples of how states are encouraging energy efficiency, particularly in several of the states whose rankings are most improved in ACEEE's annual *State Energy Efficiency Scorecard*;
- discuss the link between energy efficiency and economic development, with examples from specific studies on California, the Northeast, and Ohio; and
- summarize opportunities to use energy efficiency to create jobs and economic development in each of the states.

I conclude that there are large opportunities for cost-effective energy efficiency investments, investments that can aid economic development by

- creating direct jobs from manufacturing and installing energy efficiency measures;
- reducing energy bills for consumers and businesses as energy use declines;
- suppressing prices in wholesale energy markets as the law of supply and demand affects these markets; and
- creating indirect and induced jobs as these direct impacts ripple through the economy, particularly as consumers and businesses spend money they have saved on energy bills.

All states can benefit from these economic development impacts, with job gains of more than 600,000 possible nationally, not to mention nearly \$50 billion in net economic benefits, both by 2030. More and more states are recognizing these benefits, as illustrated by Mississippi, Oklahoma, and Arkansas. The federal government can help and encourage states through such actions as best-practice guides and technical assistance.

### Introduction

My name is Steven Nadel, and I am the executive director of the American Council for an Energy-Efficient Economy (ACEEE), a nonprofit organization that acts as a catalyst for energy efficiency policies, programs, technologies, investments, and behavior. We were formed in 1980 by energy researchers and now work with an array of researchers, businesses, and national, state, and local policymakers. I have been personally involved in energy efficiency issues since the late 1970s, and have testified multiple times before this subcommittee as well as before the full House Committee and before the Senate Energy and Natural Resources Committee.

ACEEE has been working on state policy for more than a decade. We have assisted officials and organizations with policy and program development and implementation in over half the states. We have conducted extensive research on state energy efficiency efforts and published many reports on the subject. I provide specific examples of our findings throughout this testimony.

ACEEE believes that energy efficiency should be a cornerstone of an “all-of-the-above” energy policy. Energy efficiency is generally our least expensive energy resource, meaning that it often costs less to save a unit of energy than it costs to produce that same unit of energy. As a result, large, cost-effective savings are available in all 50 states. All states are promoting energy efficiency at least to some extent, but some states more than others. These efforts are helping to create jobs and grow state economies. Many states are increasing their energy efficiency efforts, but much more is both possible and advantageous for them. I elaborate on these points in the balance of my testimony, addressing four issues:

- Energy efficiency economics
- State energy efficiency efforts including specifics for a few states
- The link between energy efficiency and economic development
- Opportunities to use energy efficiency to create jobs and economic development in all states

### Energy Efficiency Economics

Energy efficiency investments reduce the energy use of homes and businesses, reducing their monthly energy bills. Energy efficiency investment costs are incurred up front, and monthly energy bill savings provide a return on these investments. Figure 1 below illustrates the typical rate of return of energy efficiency investments relative to some other common investments. As the figure shows, energy efficiency typically provides around a 25 percent return on investment, substantially greater than most conventional investments.



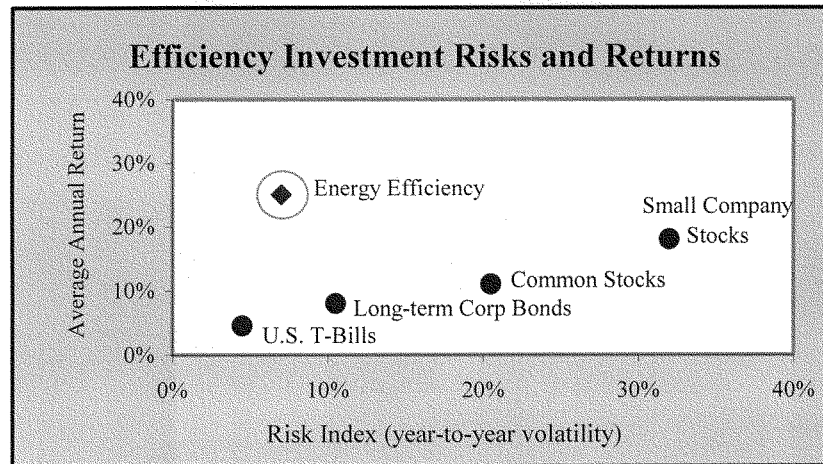


Figure 1. Risks and returns for different types of investments. *Source:* ACEEE estimates for energy efficiency; other estimates adapted from the Vanguard Group.

Importantly, the returns associated with energy efficiency are typically only available from investments with a much higher risk profile. As figure 1 shows, efficiency investments are less risky than long-term corporate bonds, yet they yield returns significantly higher than the much riskier small-cap equities market. On a risk-adjusted basis, energy efficiency is far and away one of the most attractive investment classes out there.

Another way to look at energy efficiency economics is to compare the cost of energy efficiency per unit of energy saved to the cost of supplying that same amount of energy. Figure 2 compares (a) the cost to utilities per kWh of electricity from utility-operated energy efficiency programs to (b) the cost of building and operating a new generating plant. As can be seen, energy efficiency is typically one-half to one-third the cost of conventional power. This is not to say we do not need any new conventional power plants, but rather that we can use energy efficiency to cost effectively reduce the number of conventional power plants we need.

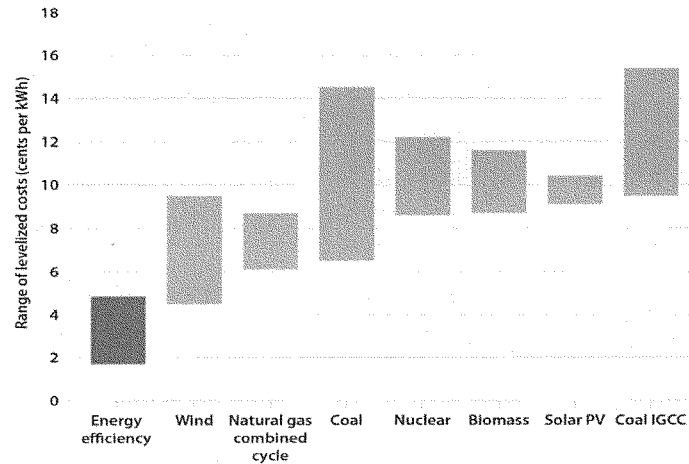


Figure 2. Cost per lifetime kWh of various electric resources. The high-end range of coal includes 90 percent carbon capture and compression. PV stands for photovoltaics. IGCC stands for integrated gasification combined cycle, a technology that converts coal into a synthesis gas and produces steam. *Source:* Energy efficiency portfolio data from Molina 2014; all other data from Lazard 2013.<sup>1</sup>

Energy efficiency also often costs less than new oil and natural gas supplies. For example, the Energy Information Administration reports that in April 2014 (the latest available data), the national average cost of natural gas was about \$1.15 per therm for residential customers (retail cost), while the average citygate price (wholesale) was about \$0.54 per therm.<sup>2</sup> An energy consulting firm, Ecotype, examined the amount of cost-effective energy efficiency available in the Pacific Northwest as a function of price-per-therm saved. The results of its analysis are shown in figure 3. Substantial efficiency savings are available at \$0.50 per therm (about \$5.12 per thousand cubic feet—the current wholesale price of natural gas) and even more at \$1.00 per therm (about \$10.25 per thousand cubic feet—the current retail residential price of natural gas).<sup>3</sup>

<sup>1</sup> Maggie Molina, *The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs* (Washington, DC: ACEEE, 2014), <http://aceee.org/research-report/u1402>; Lazard, *Levelized Cost of Energy Analysis Version 7.0*. (New York: Lazard, 2013), [http://gallery.mailchimp.com/ce17780900c3d223633ecfa59/files/Lazard\\_Levelized\\_Cost\\_of\\_Energy\\_v7.0.1.pdf](http://gallery.mailchimp.com/ce17780900c3d223633ecfa59/files/Lazard_Levelized_Cost_of_Energy_v7.0.1.pdf).

<sup>2</sup> EIA provides prices in \$/1,000 cubic feet of natural gas: [http://www.eia.gov/dnav/ng/ng\\_pri\\_sum\\_dcus\\_m.htm](http://www.eia.gov/dnav/ng/ng_pri_sum_dcus_m.htm). We convert to therms at the rate of 10.25 therms per thousand cubic feet.

<sup>3</sup> P. Storm, B. Larson, and D. Baylon, Ecotype Inc. *The Power of Efficiency: Pacific Northwest Conservation Potential Through 2020*. (Seattle: Northwest Energy Coalition, 2009), <http://nwenergy.adhostclient.com/wp-content/uploads/Power-of-Efficiency-050109.pdf>.

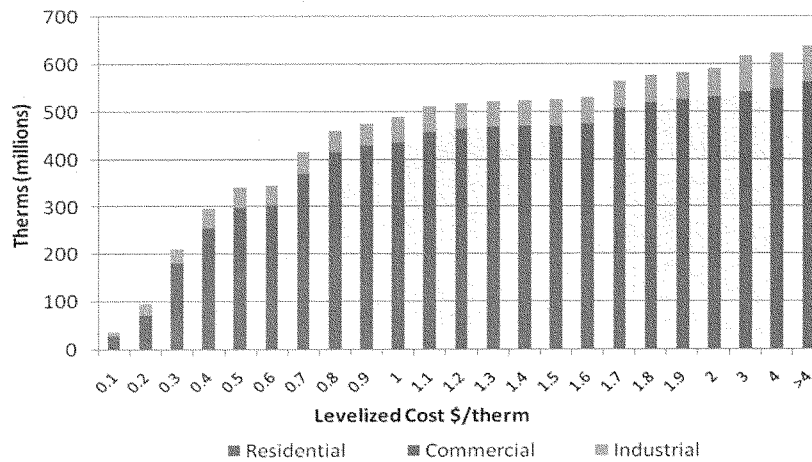


Figure 3. Northwest regional supply curve for saved natural gas. Source: Storm, Larson, and Baylon 2009 (footnote 3).

### State Energy Efficiency Efforts

Given the large amount of cost-effective energy efficiency available, all states have at least some programs to encourage and assist consumers and businesses to use energy more efficiently. ACEEE prepares an annual *State Energy Efficiency Scorecard* that evaluates energy efficiency programs, policies, and accomplishments in each state. Our 2013 scorecard examined 26 variables in 6 categories:

- Utility and public-benefit programs and policies
- Transportation policies
- Building energy codes
- Combined heat and power
- State government initiatives
- Appliance efficiency standards<sup>4</sup>

Table 1 summarizes each state's score in each of the categories.

<sup>4</sup> A. Downs et al., *The 2013 State Energy Efficiency Scorecard* (Washington, DC: ACEEE, 2013), <http://aceee.org/research-report/e13k>.

Table 1. Summary of state scores

Rank	State	Utility & public-benefits programs & policies (20 pts.)	Transportation policies (9 pts.)	Building energy codes (7 pts.)	Combined heat & power (5 pts.)	State government initiatives (7 pts.)	Appliance efficiency standards (2 pts.)	Total score (50 pts.)	Change in rank from 2012	Change in score from 2012
1	Massachusetts	19	7.5	5.5	4.5	5.5	0	42	0	-1.5
2	California	15	7.5	7	3	6.5	2	41	0	0.5
3	New York	16	8	5.5	2.5	6	0	38	0	-1
4	Oregon	14.5	7	5.5	3.5	5.5	1	37	0	-0.5
5	Connecticut	14	5.5	5.5	4	6	1	36	1	1.5
6	Rhode Island	18.5	5.5	6	2	3	0.5	35.5	1	2.5
7	Vermont	18.5	4.5	5.5	2	4	0	34.5	-2	-1
8	Washington	13	7	6	2.5	4.5	0.5	33.5	0	1.5
9	Maryland	8.5	6	5.5	2	5	0.5	27.5	0	-2.5
10	Illinois	9.5	4	5.5	2	5	0	26	4	1
11	Minnesota	15	2	3	1	4.5	0	25.5	-2	-4.5
12	New Jersey	8.5	6	4	2.5	3.5	0	24.5	4	0
12	Arizona	12	2.5	3.5	2.5	3.5	0.5	24.5	0	-1
12	Michigan	11	3	4	2	4.5	0	24.5	0	-1
12	Iowa	12	2	5.5	1.5	3.5	0	24.5	-1	-2
16	Maine	10.5	6	2.5	2	2	0	23	9	4
16	Colorado	10.5	2	4.5	1.5	4.5	0	23	-2	-2
18	Ohio	11	0	4	3.5	4	0	22.5	4	3
19	Pennsylvania	6	6	4	1.5	4.5	0	22	1	0.5
20	Hawaii	10	2.5	4	0.5	3.5	0	20.5	-2	-1.5
21	New Hampshire	8.5	1	4.5	1.5	4	0.5	20	-3	-2
22	Delaware	2.5	5.5	4.5	1.5	4.5	0	18.5	5	0
23	Wisconsin	7.5	1	3.5	2	4	0	18	-6	-4.5
24	New Mexico	7	2	4	1.5	3	0	17.5	3	-1
24	North Carolina	4.5	2.5	4	2	4.5	0	17.5	-2	-2
24	Utah	7.5	0.5	4.5	1.5	3.5	0	17.5	-3	-2.5
27	Indiana	8.5	0	3.5	1.5	2	0	15.5	6	1.5
27	Florida	2.5	4.5	4.5	1	3	0	15.5	2	-2
29	Montana	6	1	4	0.5	3.5	0	15	-4	-4
30	District of Columbia	3.5	3.5	3.5	1	2	0.5	14	-1	-3.5
31	Tennessee	2	2.5	2.5	1	5.5	0	13.5	1	-1.5
31	Idaho	5.5	0	4.5	0	3.5	0	13.5	-9	-6
33	Georgia	1.5	3	4	0.5	3.5	0.5	13	0	-1
33	Texas	2	1	4	2	3.5	0.5	13	0	-1
33	Nevada	5	0	4.5	1	2.5	0	13	-2	-3.5
36	Virginia	1	2.5	4	0.5	4.5	0	12.5	1	-0.5
37	Oklahoma	4	0.5	4	0	3.5	0	12	2	1
37	Arkansas	6	0	3.5	0.5	2	0	12	0	-1
39	Kansas	0.5	1	4	1	5	0	11.5	6	3
39	Alabama	2.5	0	4	0.5	4.5	0	11.5	1	1
39	South Carolina	3	1	4	0.5	3	0	11.5	1	1
39	Kentucky	3.5	0	3.5	0	4.5	0	11.5	-3	-2
43	Missouri	4	0	3	0.5	3	0	10.5	0	1.5
44	Louisiana	2.5	1	3.5	0.5	2	0	9.5	-1	0.5
44	Nebraska	1	0	5	0	3.5	0	9.5	-2	0
46	West Virginia	1	1.5	4	1	1.5	0	9	3	3
47	Mississippi	1	0.5	3	0	3.5	0	8	4	5.5
47	Alaska	0	1	1.5	0.5	5	0	8	-1	0
47	South Dakota	4	0	1	1	2	0	8	-1	0
50	Wyoming	2	0	2	0	1.5	0	5.5	-2	-1
51	North Dakota	0.5	1	1.5	0.5	0	0	3.5	-1	-0.5

Each year ACEEE recognizes the top performing states and also the most-improved states. The most-improved states are particularly interesting as these are the ones that are making new commitments to energy efficiency and that illustrate the growth of energy efficiency efforts at the state level. In the next few paragraphs I summarize some of the efforts of these emerging states. I also include a few other states represented by the leadership of this subcommittee.

Mississippi was the most improved state in our 2013 scorecard. After ranking dead last in 2012, Governor Bryant made it his mission to move the state up in our rankings, using energy efficiency as a strategy to spur economic development in the state. The Mississippi legislature passed laws setting a mandatory energy code for commercial and state-owned buildings (the first code update since 1975). Mississippi's Public Service Commission unanimously voted to require large electric and gas utilities to begin offering efficiency programs. Utilities filed plans earlier this year which were approved by the commission, and the state continues to work on developing a comprehensive energy efficiency strategy for utilities for 2017 and beyond. Mississippi also began to implement enhanced lead-by-example programs for state agencies, including developing energy-savings targets for public buildings and efficiency goals for state fleets.

Oklahoma is another state that has continued to make progress in our scorecard. Named the most improved in 2012, it continued to work its way up the ranks in 2013. The state put in place natural gas efficiency programs for the first time in 2011. The Oklahoma Corporation Commission has since proposed specific savings targets for electric utilities. Led by Governor Fallin, the state government also focused on energy efficiency in other sectors of the economy. In 2012, the state passed a bill calling for a 20 percent reduction in the energy use of state buildings and educational institutions. It reinstated tax credits for efficient construction and began implementing statewide building energy codes. Governor Fallin has been quoted as saying, "As governor of Oklahoma, making government smaller, smarter, and more efficient is among my top priorities. Energy inefficiency wastes natural resources and tax dollars that could otherwise be used for essential services like education, transportation, and public safety."

Arkansas is a state that has been a leader in the Southeast in recent years, and it has steadily moved up the ranks of our scorecard. The state was one of the first in the Southeast to require utilities to implement energy efficiency programs, beginning with "quickstart" programs in 2007. Starting in 2010, electric and gas utilities were required to meet new, rising energy-savings targets. The state energy office has commissioned a study to investigate savings potential beyond 2016, working under a DOE State Energy Program 2013 Competitive Award. Arkansas has also invested its resources in strengthening commercial building energy codes, and the state government leads by example, benchmarking energy use in state buildings.

Illinois became one of the top ten states for energy efficiency in our 2013 scorecard. The state has an energy efficiency resource standard that has pushed utilities to save more electricity each year. Illinois has also found a unique way to involve state organizations in the implementation of energy efficiency programs, partnering with utilities to deliver savings to low-income customers and government offices. The Illinois Department of Commerce and Economic Opportunity, charged with delivering these programs, was named an ENERGY STAR<sup>TM</sup> partner of the year in 2014. Illinois was also the first state in the Midwest to adopt the 2012 International Energy Conservation Code (IECC), a national model building code prepared by the International Code Council. The state also allocates a notable amount of funding to transportation efficiency.

Another up-and-coming state that we are watching closely is Louisiana. 2013 was a big year for the state, as regulators voted to require utilities to implement efficiency programs. Since then, all three of the state's electric investor-owned utilities have filed energy efficiency plans for the first time as required by the new quickstart rules. Though the state has not adopted the most recent building codes, it is working toward improving energy efficiency in new buildings, having completed a review of the 2009 IECC. We are expecting to see increasing levels of energy savings in Louisiana in the future.

Finally, I will highlight Kentucky. The state has been ranked in the upper 30s out of 51 states (including DC) in our scorecard for the past several years. While it does have some programs to remove disincentives for utility investments in energy efficiency—the state is supportive of lost revenue recovery, for example—it has made little investment in wide-ranging energy efficiency programs to date. Nonetheless, Kentucky shows some signs of progress. The state government leads by example, setting energy requirements for public buildings, benchmarking energy use, and encouraging the use of energy-savings performance contracts.

Additional details on these and other states are provided in our annual *State Scorecard* reports (see footnote 4). We also have an online database with detailed information on policies in each of the states (<http://aceee.org/sector/state-policy>).

### **Energy Efficiency and Economic Development**

The energy efficiency efforts states make contribute to jobs and economic development in several ways. When consumers and businesses spend money to purchase and install energy efficiency measures, they create direct, indirect, and induced jobs. Direct jobs are the jobs involved in manufacturing and installing the energy efficiency measures, such as producing and installing insulation. Indirect jobs are generated in the supply chain and supporting industries that are directly impacted by an expenditure or effort. For example, as insulation sales increase, jobs might increase at home improvement stores and trucking firms. Induced jobs are produced as the direct and indirect workers spend their paychecks, for example when they eat out or attend a baseball game.

Although oil and gas development also spur direct, indirect, and induced jobs, energy efficiency investments have two added benefits. First, as consumers and businesses reduce their energy use, they have more income to spend on other goods and services, creating additional jobs. Second, energy efficiency jobs tend to be in construction and services, two very labor-intensive sectors of the economy. Spending a dollar in construction and services generally provides more jobs than spending a dollar in other sectors. Figure 4 illustrates this disparity.

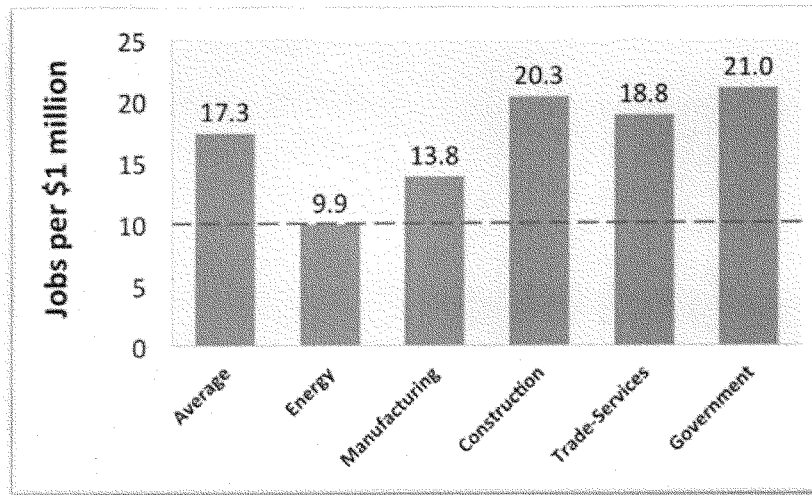


Figure 4. Jobs per millions of dollars of revenue for key sectors of the U.S. economy. Source: National coefficients from Minnesota IMPLAN Group (2011 coefficients).

Several studies have documented these effects at the state level. For example, a 2008 study by an economist at the University of California, Berkeley found that “energy efficiency measures have enabled California households to redirect their expenditures towards other goods and services, creating about 1.5 million full-time-equivalent jobs with a total payroll of \$45 billion, driven by well-documented household energy savings of \$56 billion from 1972-2006.” The economist also found that “as a result of energy efficiency, California reduced its energy import dependence and directed a greater percentage of its consumption to in-state employment intensive goods and services, whose supply chains also largely reside with the state, creating a ‘multiplier’ effect of job generation.”<sup>5</sup>

Likewise, a study by The Analysis Group looked at the impacts of the Regional Greenhouse Gas Initiative (RGGI), which involves most of the northeastern states. A major emphasis of state activities under RGGI is to increase energy efficiency efforts. This study found that actions under RGGI during the 2009-2011 period produced a total of \$1.6 billion in present economic value for the ten-state region, an average of about \$33 per capita over the three-year period. This included “the increased purchasing power associated with lower electricity bills, the economic impacts of spending money to hire people to

<sup>5</sup> David Roland-Host, *Energy Efficiency, Innovation, and Job Creation in California* (Berkeley: Center for Energy, Resources, and Economic Sustainability, Department of Agricultural and Resource Economics, University of California, Berkeley, 2008), [http://are.berkeley.edu/~dwrh/CERES\\_Web/Docs/UCB%20Energy%20Innovation%20and%20Job%20Creation%2010-20-08.pdf](http://are.berkeley.edu/~dwrh/CERES_Web/Docs/UCB%20Energy%20Innovation%20and%20Job%20Creation%2010-20-08.pdf).

perform energy audits or install solar panels, and the benefits to businesses of increased sales of energy efficiency equipment.” These activities led to 16,000 additional jobs (job-years).

The study also found that the emissions allowances “tended to increase electricity prices by less than 1 percent in the near term, but over time—as the RGGI states invested a substantial amount of the allowance proceeds on energy efficiency programs that led to lower electricity use—the program resulted in lower electricity prices and lower consumer payments for electricity.” The analysis found “reduced electricity expenditures equaling approximately \$1.1 billion over the ten-year period, reflecting an average savings of \$25 for residential customers, \$181 for commercial customers, and \$2,493 for industrial customers over the analysis period. Consumers of natural gas and heating oil saved another \$174 million, because some of the energy efficiency programs had the collateral effort of lowering use of those other heating services.” A 2014 update by The Analysis Group found that energy efficiency investments increased in 2012-2013 and estimated that this growth “will increase the overall economic benefits of the RGGI program.”<sup>6</sup>

One final example is Ohio. A 2013 analysis published by the Ohio Manufacturers Association and ACEEE found that implementing Ohio’s energy efficiency resource standard (a set of energy savings targets enacted by the legislature) would save consumers nearly \$5.6 billion through 2020, including about \$3.37 billion from reduced customer expenditures on electricity, \$880 million from the impacts of efficiency on wholesale energy prices, and \$1.3 billion from wholesale capacity price mitigation impacts.<sup>7</sup> Ohio participates in the PJM wholesale energy market, and reduced energy use and peak capacity needs reduce the price of energy and capacity as determined in this market.

### Energy Efficiency Opportunities in Each of the 50 States

All 50 states can reap the economic-development and other benefits of energy efficiency achieved in California and the Northeast. In April of 2014, ACEEE published a state-by-state analysis of the energy efficiency savings that can be achieved in each state, the costs and benefits of such investments and policies, and the impact of these efficiency investments on employment and gross state product.<sup>8</sup> The study looks at where each state is today and examines the impacts of

- establishing energy efficiency savings targets for utilities;
- adopting the latest national model building codes;
- encouraging use of cost-effective combined heat and power systems to get increased efficiency from generating power and heat together instead of separately; and
- adopting efficiency standards on several products that are now covered by such standards in a number of states.

<sup>6</sup> P. Hibbard, A. Okie, and S. Tierney, *EPA’s Clean Power Plan: States’ Tool for Decreasing Costs and Increasing Benefits to Consumers* (Los Angeles: The Analysis Group, 2014), [http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Analysis\\_Group\\_EPA\\_Clean\\_Power\\_Plan\\_Report.pdf](http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Analysis_Group_EPA_Clean_Power_Plan_Report.pdf).

<sup>7</sup> M. Neubauer et al., *Ohio’s Energy Efficiency Resource Standard: Impacts on the Ohio Wholesale Electricity Market and Benefits to the State* (Washington, DC: ACEEE, 2013), [http://www.ohiomfg.com/legacy/communities/energy/OMA-ACEEE\\_Study\\_Ohio\\_Energy\\_Efficiency\\_Standard.pdf](http://www.ohiomfg.com/legacy/communities/energy/OMA-ACEEE_Study_Ohio_Energy_Efficiency_Standard.pdf).

<sup>8</sup> Hayes et al., *Change is in the Air: How States Can Harness Energy Efficiency to Strengthen the Economy and Reduce Pollution* (Washington, DC: ACEEE, 2014), <http://www.aceee.org/sites/default/files/publications/researchreports/e1401.pdf>.



Overall, we found that these state efforts could

- reduce national electricity use by 25 percent in 2030 relative to business-as-usual projections;
- provide discounted net benefits of about \$48 billion by 2030;
- increase GDP by about \$17 billion in 2030; and
- support more than 600,000 jobs nationally in 2030.<sup>9</sup>

Table 2 on the next page summarizes the number of jobs created in each state by these energy efficiency policies and investments.

### **Conclusion**

States are stepping out and leading energy efficiency efforts in the United States as a way to save energy, lower consumer bills, and promote economic development. Energy efficiency is a bipartisan effort at the state level. There are major opportunities for cost-effective energy efficiency investments, investments that can aid economic development by

- creating direct jobs from manufacturing and installing energy efficiency measures;
- reducing energy bills for consumers and businesses as energy use declines;
- suppressing prices in wholesale energy markets as the law of supply and demand affect these markets; and
- creating indirect and induced jobs as these direct impacts ripple through the economy.

All states can benefit from these economic development impacts, with job gains of more than 600,000 possible nationally, not to mention nearly \$50 billion in net economic benefits, both by 2030. More and more states are recognizing these benefits, as illustrated by Mississippi, Oklahoma, and Arkansas. The federal government can aid and encourage states through such actions as best-practice guides and technical assistance.

This concludes my testimony. Thank you for the opportunity to present this information.

---

<sup>9</sup> These are "net jobs," meaning jobs spurred by the efficiency investments minus the small loss in jobs in energy industries because energy demand would be a little lower.

Table 2. Net jobs by state from adoption of four energy efficiency policies

State	2020	2030	State	2020	2030
Alabama	3,900	9,400	Montana	800	1,800
Alaska	400	900	Nebraska	1,300	3,300
Arizona	11,000	23,300	Nevada	2,100	5,100
Arkansas	1,800	4,800	New Hampshire	1,400	2,700
California	30,600	53,000	New Jersey	6,300	13,300
Colorado	4,900	10,200	New Mexico	1,800	3,800
Connecticut	3,600	6,500	New York	22,800	40,100
Delaware	700	1,700	North Carolina	7,700	18,700
District of Columbia	600	1,400	North Dakota	700	1,400
Florida	13,300	38,400	Ohio	10,600	23,000
Georgia	7,300	18,500	Oklahoma	2,400	6,500
Hawaii	2,000	3,800	Oregon	4,000	7,000
Idaho	1,300	3,100	Pennsylvania	7,900	16,600
Illinois	8,800	19,800	Rhode Island	700	1,300
Indiana	5,500	11,900	South Carolina	4,600	10,800
Iowa	4,000	5,900	South Dakota	600	1,500
Kansas	2,500	5,400	Tennessee	6,200	13,500
Kentucky	3,600	8,700	Texas	19,800	55,300
Louisiana	5,000	11,500	Utah	2,700	5,900
Maine	1,400	2,800	Vermont	700	1,200
Maryland	3,700	7,900	Virginia	5,200	13,000
Massachusetts	7,600	12,600	Washington	4,300	10,200
Michigan	6,600	13,800	West Virginia	1,300	2,700
Minnesota	6,200	9,700	Wisconsin	6,400	9,900
Mississippi	2,900	7,000	Wyoming	600	1,300
Missouri	4,700	10,600	<b>National</b>	<b>288,900</b>	<b>611,200</b>

Mr. WHITFIELD. Thank you very much, Mr. Nadel.

At this time, I recognize Dr. Paul Polzin, who is the director emeritus of the Bureau of Business and Economic Research at the University of Montana. Thanks very much for being with us, and Dr. Polzin, you are recognized for 5 minutes. Be sure and——

#### STATEMENT OF PAUL E. POLZIN

Mr. POLZIN. Thank you, Mr. Chairman, and members of the committee. My name is Paul Polzin, and you heard that my title was director emeritus. That just simply means I flunked retirement, and I still go into the office there almost every day.

Now, I have spent the last 45 years of my life studying the Montana economy, and also studying the economies of rural communities in the west. The purpose of my testimony today is to document the economic impact of the new American energy revolution. I am going to be looking at the specific impacts on 2 rural communities, and rural communities are really an ideal laboratory to look at economic impact, because you can easily differentiate between causes and effects.

Now, when we mention economic impact, the first thing that comes to mind are taxes. Well, there are plenty of taxes associated with the new American energy revolution. In my part of the world, the oil and gas industry alone paid the Federal Government and the State of Montana about \$285 million in taxes, royalties and other payments, but the real economic impact is on people, and how the energy boom affects their employment opportunities and their wages. I looked at 2 specific communities; Sidney, Montana, and Williston, North Dakota. They sit right on the Montana-North Dakota border, and that is at the western edge of the Bakken oil field, which is the new field that is being developed using new technologies, and has seen dramatic increases in production.

Now, I analyzed counties rather than cities because that is just the way the data are published. Sidney, Montana, is in Richland County, and Williston, North Dakota, is in Williams County. Now, for most of the last 35 years, both economies have been stagnant. The number of jobs in Richland County and Williams County in the early 2000's was just at about the same level that it was in the mid-1980's, but the trend turned upward in 2004, and accelerated in 2010. This mirrors precisely the drilling and other energy-related activity, and the most recent data showed double-digit increases.

Now, there are boomtown atmospheres in places like Richland County and Williams County. The streets are full of petroleum engineers, drilling managers, and environmental specialists, and there are well-paid workers. Nationwide, the average annual wage in the oil and gas industry was about \$108,000 a year in 2013; roughly double the average of \$49,000 for all American workers. But it is not just these oil and gas industry workers who are benefiting. I looked at 3 specific industries in each of these counties. I found that employment opportunities and wages in all 3 increased faster than expected. I looked at the construction industry, which includes skilled, blue-collar workers; I looked at professional services, and this includes lawyers, architects and accountants; and also I looked at the accommodations industry, which is tradition-

ally a low-paying industry, and provides employment opportunities for entry-level workers. The findings in all 3 of these industries in both communities are the same. For the 10-year period from 2003 to 2013, employment and wages in all of these industries increased much faster than otherwise would have been the case. In other words, there are more jobs and the wages are higher than would have occurred without energy development. In all 3 of these industries, in both counties, average wages in 2013 were higher than their respective statewide average. Now, as an experienced rural researcher, I know how unusual it is to have rural wages higher than the statewide average. In most cases, the statewide averages are dominated by higher wages in urban areas.

In summary, higher wages and a stronger rural economy, when they are combined with good policies on energy royalties and tax distribution can enable communities, counties and States better adjust to energy projects that may have periodic peaks before they stabilize in the long run.

Thank you very much.

[The prepared statement of Mr. Polzin follows:]

Testimony of Paul E. Polzin

**Program for Energy and Resource Economics  
Bureau of Business and Economic Research**

University of Montana  
Missoula, MT 59812

[paul.polzin@business.umt.edu](mailto:paul.polzin@business.umt.edu)

---

Summary of Testimony

1. The new American energy boom associated with shale oil and natural gas extraction has led to significant increases in high-paying jobs in the energy sectors of the U.S. economy.
2. The energy boom has stimulated certain long-stagnant rural economies.
3. It is not just the energy sectors that have benefited. Employment and wages have increased more than expected in many other industries. These other industries include workers with a wide variety of education, skill and training.
4. Higher wages and stronger rural economies—along with policies on energy royalties and other revenue distribution and impact planning and assistance—can better enable counties and states adjust to energy projects that may have periodic peaks before they stabilize.

The new American energy boom has been a bonanza for federal and state government revenues. In my home state of Montana, the oil and gas industry paid about \$282.1 million in taxes, royalties, leases, and other payments to state and federal governments in 2013.

But the energy boom is not simply about taxes. It is also about people, their jobs and their wages. Increased energy-related activity is impacting the U.S. economy and certain regional economies that have long been mired in stagnation. Employment in the U.S. energy industry has provided many new high-paying jobs while other sectors of the economy have experienced stable or even declining employment. In addition, certain localities across the country that had stable or declining economies are now experiencing welcome growth because of new energy developments. It not just people in energy industries that are benefitting; workers in industries such as construction, professional services, and accommodations now have greater employment opportunities and higher wages.

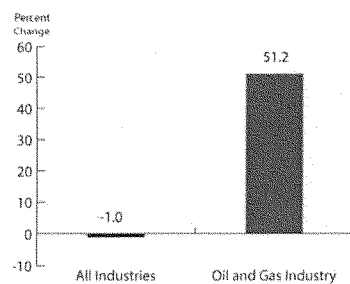
#### The U.S. Economy

The U.S. economy has been mired in a deep recession and a jobless recovery since 2007. The U.S. Bureau of Labor Statistics (BLS) reports that total nonfarm employment in the U.S. has not regained its prerecession peak by 2013. Overall, the number of nonfarm jobs declined about 1.0 percent between 2007 and 2013.

The oil and gas industry (technically part of mining), on the other hand, increased employment during the same period. Between 2007 and 2013 the number of oil and gas workers increased almost 51.0 percent.

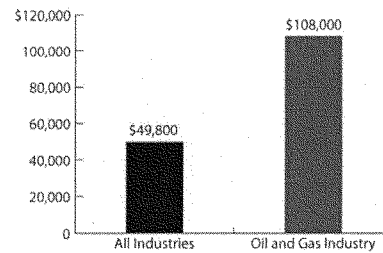
The oil and gas jobs are high paying. The BLS reports that the U.S. average annual wage (which excludes employer-paid benefits) in the oil and gas industry was about \$108,000 during 2013, the latest full year available. That is more than double the average of \$49,800 for all workers.

Figure 1  
Percent Change in U.S. Employment, 2007-2013



Source: U.S. Bureau of Labor Statistics

Figure 2  
Average Wages and Salaries per Worker, U.S., 2013



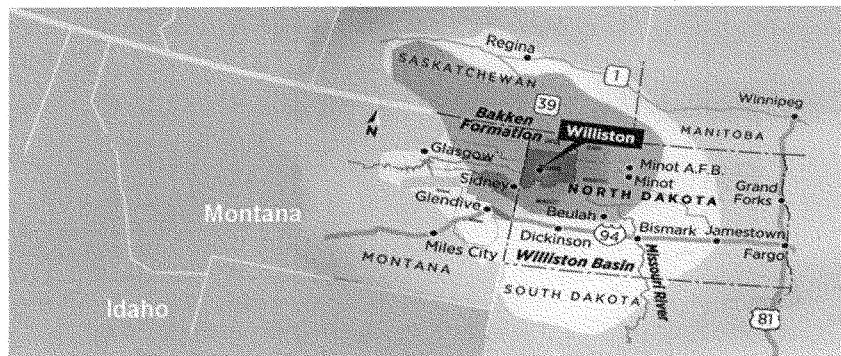
Source: U.S. Bureau of Labor Statistics

### The Bakken Shale Play

The economic impacts of the new American energy boom are more dramatic when we look at a specific location. On the Montana-North Dakota border-- which includes the western edge of the Bakken formation-- is one of the newer oil-technology plays that is based on the latest advances in geophysics, nanotechnology, engineering and production management and has led to the shale-energy revolution. Small rural communities are the idea laboratory for economic analysis because the economic impacts of energy developments are not masked by other influences and trends.

Figure 2

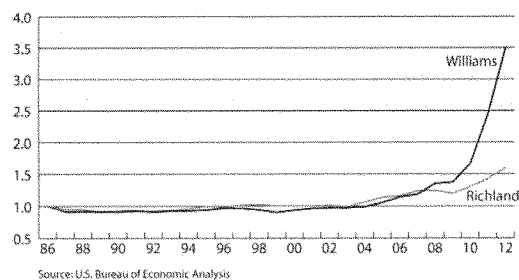
The Bakken Shale Oil and Gas Play



There are boom town atmospheres in towns like Sidney, Montana, and Williston North Dakota. As shown in Figure 3, these towns are located in the adjacent counties of Richland in Montana and Williams in North Dakota. In both counties, the oil drillings rigs sprout like wild flowers, the traffic is astonishing, and there are no vacancies in the few motels. To put things into perspective, before the energy boom

began, Richland County had a 2001 population of 9,424 persons with total employment of 6,057 while Williams County had 19,610 residents and 12,822 workers.

Figure 4  
Nonfarm Wage and Salary Employment Richland County, MT,  
and Williams County, ND 1986 to 2013 (1986 = 1.00)



Richland and Williams counties weren't always booming. As shown in Figure 4, both counties experienced stagnation during most of the last 30 years. From 1986 until just a few years ago, the total number of nonfarm jobs in each county remained stable. Then,

both began to grow beginning about 2004, corresponding exactly to the onset of new drilling activity. The upward trend began slowly and even stopped during the recession years of 2008 and 2009. With the onset of technological advances in horizontal drilling and other factors, employment growth accelerated dramatically beginning in 2010.

The growth has been greater in Williams County than in Richland County. Although there are small differences in the resource taxes and regulations between Montana and North Dakota, most experts do not believe they are the cause of the differential development. Instead, they point to the quality of the deposits, economies of scale, and other technical factors leading to the interstate differences.

The streets of Sidney and Williston are crowded with petroleum engineers, drilling managers, environmental specialists and other natural resource workers. But these high-paying specialties are not the only ones to benefit from the boom. Almost all sectors of the local economies are experiencing greater than expected growth in employment opportunities and wages due to the energy boom. The following paragraphs look at employment and wage trends in three specific industries in Richland and Williams counties that represent a wide variety of sectors in the local economies.

The construction industry (NAICS 23) consists of skilled craftsmen building a variety of industrial, commercial and residential projects. As shown in Table 1, statewide employment grew 3.6 percent in Montana and 105.0 percent in North Dakota between 2003 and 2013. In Richland and Williams counties, the corresponding figures are a 109.0 and 900.2 percent increases. Average wages per worker increased 42.1 percent in Montana and 85.0 percent in North Dakota from 2003 to 2013. The growth was 105.9 percent in Richland County and 178.1 percent in Williams County during the same period.

Table 1 Percent Change in Employment and Average Wages per Worker Construction Industry (NAICS 23) 2003 to 2013		
Area	Change in Employment	Change in Wages/Worker
Montana	3.62%	42.1%
Richland County	109.0%	105.9%
North Dakota	105.0%	85.0%
Williams County	900.2%	178.1%
Source: U.S. Bureau of Labor Statistics		

Professional, scientific, and technical services (NAICS 54) contain highly educated professionals such as lawyers, accountants, architects, and computer specialists. Table 2 reports that Montana employment in that sector increased 21.1 percent between 2003 and 2013 while the corresponding figure for North Dakota was 44.7 percent. Employment growth in Richland County was 130.0 percent and in Williams County it was 410.6 percent. Average wages per worker increased 86.7 percent in Montana and 54.3 percent in North Dakota. Wages per worker rose about twice as fast as their respective statewide averages in Richland and Williams counties; 169.0 percent in the former and 140.1 percent in the latter.



Table 2 Percent Change in Employment and Average Wages per Worker Professional, Scientific and Technical Services (NAICS 54) 2003 to 2013		
Area	Change in Employment	Change in Wages/Worker
Montana	21.1%	86.7%
Richland County	130.0%	169.0%
North Dakota	44.7%	54.3%
Williams County	410.6%	140.1%
Source: U.S. Bureau of Labor Statistics		

The accommodation industry (NAICS 721) has traditionally paid low wages and is often mentioned as providing entry-level positions for those with few skills. As shown in Table 3, Montana employment increased 17.3 percent from 2003 to 2013, while the corresponding growth in North Dakota was 67.4 percent. In Richland County the growth was 209.3 percent, and in Williams County the increase was 355.7 percent. Average wages in Montana increased 44.0 percent during the 10 year period, and the figure for North Dakota was 93.1 percent. Once again, the increase in Richland and Williams counties were well about the statewide figures; 191.1 percent in the former and 292.1 in the latter.

Table 3 Percent Change in Employment and Average Wages per Worker Accommodation Industry (NAICS 721) 2003 to 2013		
Area	Change in Employment	Change in Wages/Worker
Montana	17.3%	44.0%
Richland County	209.3%	191.1%
North Dakota	67.4%	93.1%
Williams County	355.7%	292.1%
Source: U.S. Bureau of Labor Statistics		

**Summary**

What does all this mean? Simply put, the economic impacts of the energy boom are being felt in all sectors of the economy.

Employment and wage increases have been significant in the energy sectors, of course, but also in industries with workers that have a wide variety of education, skill, and training. Each of the specific industries we examined earlier now has average wages per worker above their respective statewide figures, and several are well above.

It is rare for rural wages to exceed state averages that may be dominated by higher urban wages. However, such trends in energy producing areas can have powerful effect in strengthening rural economies.

In addition, higher wages and stronger rural economies—along with good state-level policies on energy royalties and other revenue distribution, and impact planning and assistance—can better enable communities, counties, and states adjust to energy projects that may have periodic peaks before they stabilize.

Mr. WHITFIELD. Thank you, Dr. Polzin, very much.

And our next witness is Dr. Bernard Weinstein, who is the Associate Director of the Maguire Energy Institute of the Cox School of Business at Southern Methodist University.

So, Dr. Weinstein, thanks for being with us. You are recognized for 5 minutes for your opening statement.

#### STATEMENT OF BERNARD L. WEINSTEIN

Mr. WEINSTEIN. Thank you very much, Mr. Chairman, and members of the committee, for the invitation to speak today.

I want to talk briefly about 2 topics; number 1, the future of coal, and, 2, State energy policies.

There may or may not be a war on coal. That may be hyperbolae, but in any case, coal is being challenged as a power source as never before. Number 1, you have competition from abundant and cheap natural gas, as well as renewables. We now have EPA greenhouse emission standards being proposed for both existing and new power plants. It is highly unlikely that a new coal plant will be constructed in the foreseeable future. We also have regulatory and legal barriers to exports. So I think it is fair to say, and you can see on this graph, that coal is slowly going away. In fact, we have lost about 15 percent, or we will lose about 15 percent of our coal-fire-generating capacity between 2010 and 2016. But a couple of caveats. Some people are very pleased about the fact that coal is going away, but we need to keep in mind that we get almost 40 percent of our electricity from coal. It can't be quickly replaced by alternatives. Renewables, as we have heard, are intermittent. We need base load capacity. There are serious issues of grid reliability when demand peaks. Texas has got more installed wind capacity than any other State, but I guarantee you, at 3 o'clock this afternoon, 95 percent of those wind turbines in west won't be turning, and that is when demand is going to be at its peak.

Then there are issues related to distributor generation. That is posing challenges for grid reliability, as well as the finances of investor-owned utilities. You know, who is going to pay for that backup capacity? So we need to keep in mind that coal is still the cheapest way to generate electricity, and that, as coal goes away, power costs to consumers and businesses are likely to increase. And I make those comments because I think EPA needs to take cognizance of these and other issues as it finalizes the greenhouse gas rules for both coal and gas-fired plants.

Now, getting back to the main topic today: energy and economic development. We have seen an incredible increase in oil production just in the last 3 or 4 years; about a 50, 60 percent increase. We didn't see this coming. It has been great for the economy, and it is not just in a couple of States. I mean there is shale all over the United States, as you can see in this graph. Some States have embraced energy development, while some energy-rich States have opposed energy development. So I am going to make, you know, a couple of comments about Texas, California, North Dakota and New York.

First, let us contrast Texas with California. It is a little hard to see, but the red line is—the red lines are Texas and the blue lines are California. The red line going up is increased oil production in

Texas; the blue line going down is declining oil production in California, and then the dotted lines are the unemployment rates. Guess which State has the lower unemployment rate. Texas has added 548,000 jobs in the past 18 months. California, which is half, again, as large as Texas, has added only 322,000 jobs in the past 6 years. California is home to the Monterey shale which is estimated to hold up to  $\frac{2}{3}$  of America's shore oil—shale oil reserves, and yet, because of environmental pushback, regulations and the like, it is not being developed.

Now, real quickly, if we put the next one up, I don't want to talk too much about North Dakota and New York because we have already heard a lot about North Dakota and New York. This is employment growth in the U.S. on the left, employment growth in North Dakota on the right.

Four years ago, North Dakota was producing 10,000 barrels of oil per day. Today, it is 1 million barrels of oil per day. Booming economy, lowest unemployment rate in the United States. We have already—Mr. Siegel talked about New York State. This study was actually done by his institute, maybe it was done by Mr. Siegel, looking at the potential job growth that could occur along that southern tier of New York State if the current moratorium on hydraulic fracturing were lifted. So we will just have to see how that plays out, but this part of the State has been losing people and jobs for decades.

Just kind of to summarize. Here are some selected energy States. The blue bar represents the increase in oil and gas jobs, the red line represents the increase in GDP growth, and you can see that in all of these energy-producing States, we have seen a tremendous increase in the economic growth. And look at Pennsylvania. We heard about Pennsylvania earlier. Look at the tremendous increase in oil and gas employment. If it hadn't been for that increase, Pennsylvania would have had a very serious recession like the rest of the country. It helped Pennsylvania avoid the worst of the great recession. And New York State, right across the border, as we have heard, does not allow the use of hydraulic fracturing.

So I think it is incontrovertible that States embracing energy development have healthier and more robust economies than those fighting energy development.

Do keep in mind 2 other points that have not been mentioned, is that greenhouse gas emissions in the United States are at a 20-year low, even though our economy is 70 percent larger.

A final point I would make: We have heard a lot about all the jobs that have been created in renewables. The administration says that their policies have created 75,000 jobs in renewable energy. I might add, at a cost of \$50 billion in Federal subsidies. The oil and gas industry has created 700,000 new jobs in the last 4 or 5 years without any new subsidies.

So I will be happy to answer any questions at the appropriate time.

[The prepared statement of Mr. Weinstein follows:]

**Testimony of Bernard L. Weinstein, Ph.D.**  
**Associate Director, Maguire Energy Institute**  
**Cox School of Business**  
**Southern Methodist University, Dallas, Texas**  
**Before the House Committee on Energy and Commerce, Subcommittee on**  
**Energy and Power**  
**Hearing on “Laboratories of Democracy: The Economic Impacts of State Energy**  
**Policies”**  
**July 24, 2014**

Mr. Chairman and Members of the Committee, my name is Bernard Weinstein and I am the Associate Director of the Maguire Energy Institute at Southern Methodist University (SMU) and an adjunct professor of business economics at SMU's Cox School of Business. Thank you for this opportunity to speak to you today.

I want to address two topics today: first, the ongoing “War on Coal” and its implications for electric power costs and grid reliability; and second, the contrasting economic performance of those states that have embraced energy development with those that haven't.

***The War on Coal***

President Barack Obama, in pursuit of his “Climate Action Plan,” has been using his executive power in an effort to limit carbon dioxide (CO<sub>2</sub>) emissions from both new and existing power plants, further increase fuel economy standards for motor vehicles, and provide additional incentives for the development of renewable energy sources. Among these initiatives, the potentially most damaging to the economy are those related to power generation.

Electricity drives our economy, and nearly 40 percent of the electrons on the grid still come from coal-fired power plants, which will be most affected by mandates to reduce CO<sub>2</sub> emissions and other greenhouse gases (GHG). Coal's contribution to the electricity mix has been slowly declining in recent years, mainly because of a sluggish economy and comparatively cheap natural gas prices.

According to projections by the Energy Information Administration, by 2016 we'll see a capacity decline of 42 gigawatts, or 14 percent, in the nation's coal-fired generating capacity since 2012 (see Figure 1). Without question, the Environmental Protection Agency's (EPA) proposed GHG standards for new and existing coal-fired power plants will accelerate plant closures. Indeed, these standards are so restrictive they will likely block the construction of new

coal-fired power plants in Texas and elsewhere unless they utilize novel and expensive technology to capture carbon. The newest and most advanced coal-fired generators in Texas, and the rest of the nation for that matter, can't meet the proposed emissions limit of 1,100 pounds of CO<sub>2</sub> per megawatt hour for new power plants.

The consequences, in terms of higher energy costs and compromised grid reliability, could be serious. The new standards could also derail America's nascent industrial revival while eroding the competitiveness of U.S. manufacturers. Hundreds of thousands of jobs are at risk—not a happy prospect in an economy that's barely growing five years after the Great Recession with 9.5 million workers currently unemployed and millions more underemployed or discouraged from even looking for work.

Policy-makers and regulators must keep in mind that a one percent increase in economic output necessitates a 0.3 percent increase in energy use. By extension, any combination of policies that serves to increase the price of electricity or reduce the reliability of energy sources will have a negative impact on economic growth. Higher power costs can be especially detrimental to manufacturing industries, who consume proportionately more electricity than other sectors of the economy. Five million manufacturing jobs were lost during the Great Recession, and relatively few have come back during the recovery. But manufacturing still matters because of its strong linkages with other sectors of the economy. About one in eight private sector jobs relies on America's manufacturing base.

We can ill-afford to risk undermining the availability of power in the U.S., placing electricity reliability in jeopardy and risking catastrophic economic impacts. Coal-fired plants cannot be replaced overnight by natural gas plants, and they certainly cannot quickly be replaced by alternative energy facilities. The time it takes to install pipeline and other infrastructure necessary even to begin the conversion of an old plant or construction of a new one is considerable. Accordingly, if EPA regulations accelerate the closure of coal-fired power plants, that, in turn, will increase the probability of an insufficient supply of electricity at times when demand peaks, such as during hot weather, or when there are unexpected problems with electricity generation or transmission.

EPA should not be developing long-term energy policy through environmental regulation. The improper regulation of GHG's could drastically reduce the diversity of this country's energy sources, particularly by minimizing coal-fired power generation, and hold the nation hostage to volatile natural gas prices and intermittent renewables like wind and solar for the next fifty years.

For example, proponents of the EPA's proposed GHG rules contend they will incentivize renewable energy in states where such resources are a possibility. But we know from recent experience that the fastest growing form of renewable power is so-called rooftop solar, a form of distributed generation. The business model for this expansion is likely to be third-party leases for periods of 20 years or more, where available subsidies are transferred to third parties and where the leases are eventually securitized and sold as financial instruments on Wall Street.

There are a number of issues that must be resolved before federal rules encourage the transfer of affordable, reliable fossil-fuel base load electric power for leased rooftop solar. Since rooftop solar depends on the use of the electric grid for backup and for sales of excess power, net

metering policy must take into account a fair allocation of the costs necessary to maintain grid integrity. Without doing so, relatively wealthy solar households or Wall Street investors will essentially be subsidized by lower income base load customers. Further, replacing reliable power sources with intermittent ones can have profound negative impacts for overall system reliability.

These risks must be taken seriously. As the Institute of Electrical and Electronics Engineers (IEEE) has stated, “a reliable supply of electricity is more than just a convenience, it is a necessity; the global economy and world’s very way of life depends on it.”<sup>1</sup> IEEE further observes that “Even minor occurrences in the electric power grid can sometimes lead to catastrophic ‘cascading’ blackouts. The loss of a single generator can result in an imbalance between load and generation, altering many flows in the electricity network.” The direct costs to high-technology manufacturing in just the San Francisco Bay Area during the California blackouts alone ran as high as one million dollars a minute due to lost production. The relatively brief Northeast blackout of 2003 cost business about \$13 billion in lost productivity.<sup>2</sup>

The administration and Congress must also acknowledge that America, by itself, can do little to reduce global greenhouse gas emissions. In fact, GHG emissions in the United States today are at a 20-year low, even though the economy is more than 50 percent larger. The only effective way to significantly reduce global GHG emissions is through a coordinated strategy involving all of the planet’s major economies. Otherwise, any marginal reductions in America as a result of shuttering coal plants will be more than offset by rising emissions in China, India, Brazil, and other fast-growing economies around the world.

#### ***Energy development and economic growth: a contrast among the states***

As is generally well known, America is in the midst of an oil and gas boom unlike anything we’ve seen since the 1920s, thanks largely to the technologies of horizontal drilling and hydraulic fracturing in the various shale plays around the country. Domestic oil production has jumped 40 percent since 2010 and is now above its peak in the mid-1980s (see Figure 2). By 2016 at the latest, the U.S. will have reclaimed its crown as the world’s number one oil producing country. Natural gas output has also climbed dramatically, up 33 percent since 2010, pushing us ahead of Russia to become the planet’s number one gas producer (see Figure 3).

Five years ago, the oil and gas industry accounted for only 3 percent of America’s economic output. Today, it’s more than 10 percent (see Figure 4). Employment in the oil and gas industry is up nearly 30 percent since 2008 while total U.S. employment has just returned to its pre-recession level. Because of higher domestic production, oil imports have dropped from 50 percent of consumption to 30 percent in just five years, helping to lower our trade deficit and improve America’s global competitiveness.

Contrary to the commonly-held belief that only a few states are in the energy business, the Energy Information Administration reports that 24 states are currently producing commercial

<sup>1</sup> IEEE, *Reliability and Blackouts*, at <http://electripedia.info/reliability.asp> (accessed Nov. 11, 2011).

<sup>2</sup> G.F. McClure, *Electric Power Transmission Reliability Not Keeping Pace with Conservation Efforts*, *Today’s Engineer* (online)(Feb. 2005).

quantities of coal, 31 are producing crude oil, and 33 are producing natural gas. What's more, current and prospective shale plays are found in most part of the U.S. (see Figure 5).

But the shale revolution has not been embraced by all of the states who are situated above the shale formations. In those states that have chosen to pursue energy development, output and jobs have grown faster than in most other states while their unemployment rates are well below the U.S. average of 6.1 percent. For example, Texas, which has aggressively developed its shale fields, has witnessed a 100 percent increase in oil production since 2010 and currently records an unemployment rate of 5.1 percent. By contrast, New York State, whose southern tier sits atop one of the "sweet spots" of the Marcellus Shale, has imposed a ban on hydraulic fracturing with the result that oil and gas production has plummeted in recent years while the state's unemployment rate is currently at 6.7 percent, with some upstate counties as high as 7.5 percent.

#### 1. Texas v. California: Two large energy states pursuing different paths

Last year, Texas led the nation in job creation for the fourth straight year, adding 323,000 workers to payrolls. Through June of this year, another 225,000 jobs have been created and the state currently boasts the lowest unemployment rate (5.1%) of any large state. More incredibly, Texas has accounted for almost 35 percent of the nation's job growth since 2000 (see Figure 6).

Without question, the tremendous growth in oil and gas production resulting from the "shale revolution" has accounted for much of Texas' superior economic performance. The state now accounts for more than 25 percent of America's oil and gas and would rank as the 14<sup>th</sup>-largest producer in the world if we were a separate nation.

Texas' economic fortunes can also be attributed to a positive business climate and sensible, cost-effective regulation of energy and other sectors of the state's economy. Contrary to assertions by some environmental activists, Texas is not a toxic wasteland. We care greatly about the quality of our air, water and land. But we make sure our regulatory environment is predictable and effective so that the costs of compliance aren't burdensome to the point of discouraging new investment.

California's economy has recovered somewhat from the Great Recession, though total payroll employment growth since 2008 has been a mere 322,100—about the same as Texas' gains last year. Had the state been more supportive of energy development, especially in the huge Monterey Shale, California would likely have posted much faster job gains and its unemployment rate wouldn't be 7.4 percent, the highest among the 10 largest states with the exception of Michigan.

According to some estimates, the Monterey Shale, which runs from Los Angeles to San Francisco, contains approximately two-thirds of America's total shale oil reserves, or 15 billion barrels. Unfortunately, hydraulic fracturing has been roundly opposed by the state's influential environmental community as well as many state and local government officials. Consequently, oil production has been falling rapidly in California for more than a decade while output in Texas has skyrocketed (see Figure 7).



If California were to adopt more accommodating energy policies and regulations, the state could realize huge economic benefits. According to a recent study conducted by the University of Southern California and the Communications Institute, a Los Angeles think tank, development of the Monterey Shale would generate 500,000 direct and indirect jobs within three years and 2.8 million direct and indirect jobs within a decade.

## 2. David v. Goliath: North Dakota slays New York

Two years ago, North Dakota passed Alaska to become America's number two oil producing state. In just a few years, production has jumped from 10,000 barrels per day to more than one million barrels per day.

North Dakota is unique in that very few states sit atop formations like the Bakken Shale. But in addition to its resource base, the state's business-friendly policies have helped grow its energy sector. Unlike New York, which prohibits the use of hydraulic fracturing, North Dakota offers an accommodating and supportive business and regulatory climate that encourages new investment in oil and gas production. Since 2008, North Dakota has created jobs at a faster clip than any other state and currently records the nation's lowest unemployment rate, 2.9 percent (see Figure 8).

Could New York replicate the experience of North Dakota? As mentioned earlier, the southern tier of New York is one of the "sweet spots" of the Marcellus Shale, the largest gas field in the continental United States. But because of the fracking ban, thousands of potential jobs and millions of new tax revenues are being forfeited. For example, the New York State Department of Environmental Conservation estimates that at least 25,000 new jobs would be created quickly if the state lifted the ban, and that figure doesn't include the indirect and induced employment that would follow. Another study, prepared by Michael Orlando of the University of Colorado, estimates that drilling and producing activities could support 39,000 new jobs in New York State within three years and 69,000 jobs within ten years. And the Manhattan Institute recently projected that with shale development, total employment in upstate New York by 2020 would be 54,000 higher than without shale development (see Figure 9).

## 3. Economic performance of other energy states

As Figures 10 and 11 indicate, other states that have encouraged their energy sectors have outperformed the U.S. averages for job creation and economic growth in recent years. But it's important to note that the economic benefits from energy development are benefiting the entire nation, not just those states producing oil and gas. The shale boom has helped to revive America's industrial base, boost our exports, and reduce our reliance on imported oil while creating hundreds of thousands of high-wage jobs. At the same time, cheap and abundant natural gas is reducing electricity and heating costs for millions of American households and businesses.

FIGURE 1

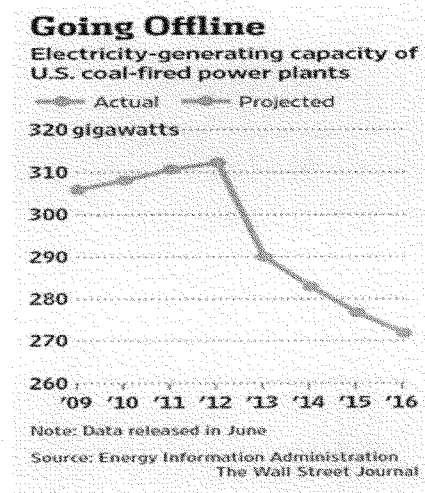


FIGURE 2

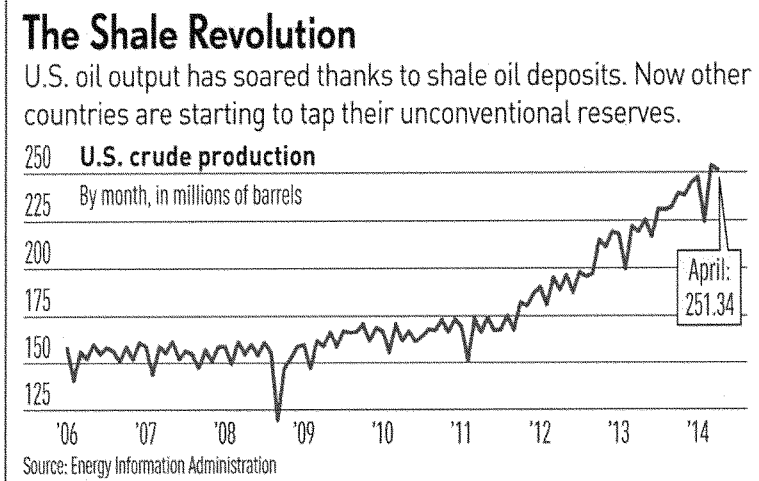


FIGURE 3

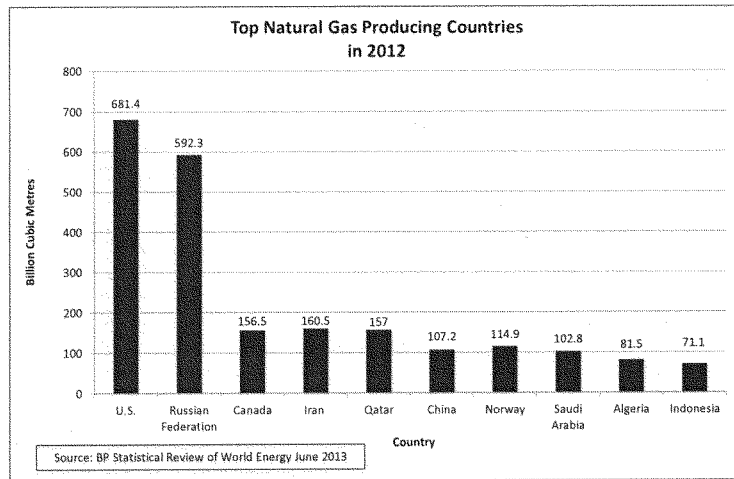
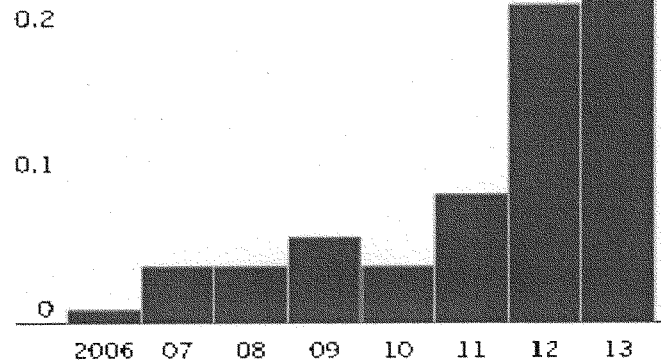


FIGURE 4

### Contribution of oil and gas industries to GDP growth

% points



Source: White House Council of Economic Advisers

FIGURE 5

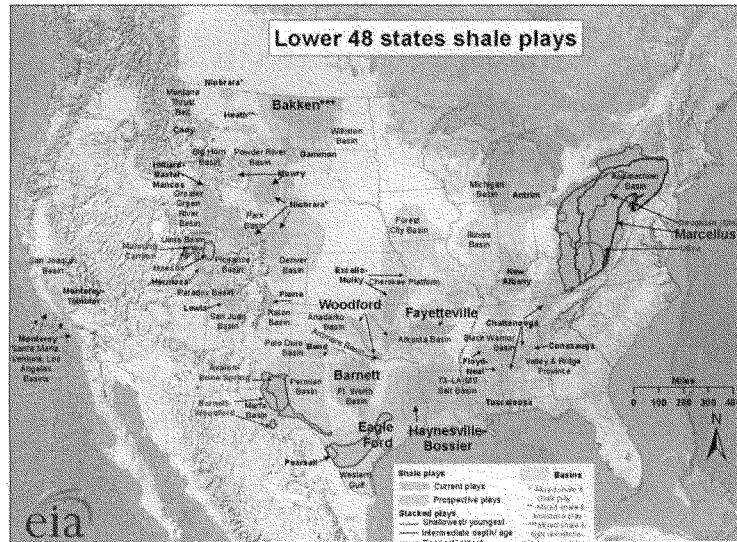


FIGURE 6

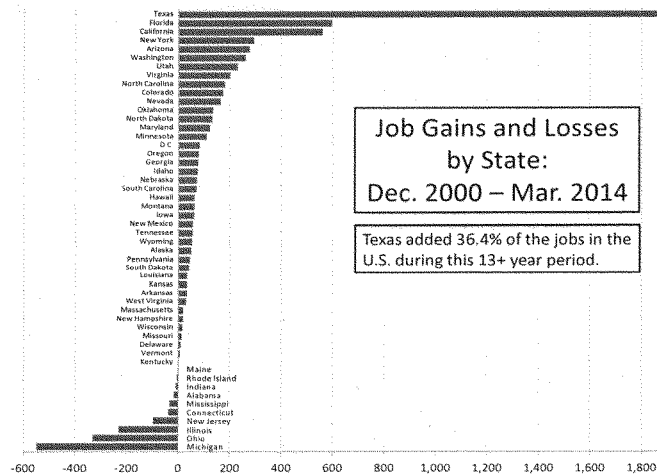


FIGURE 7

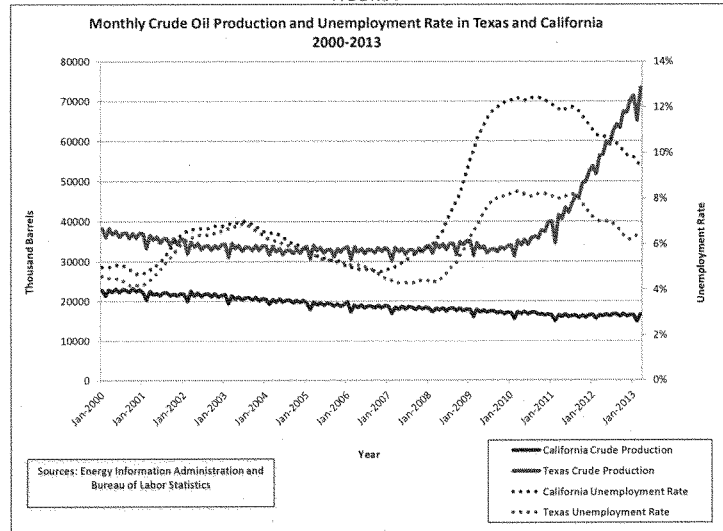


FIGURE 8

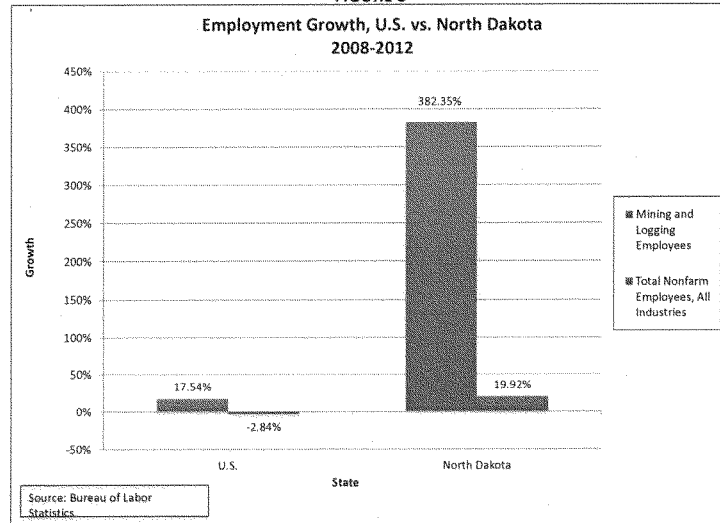


FIGURE 9

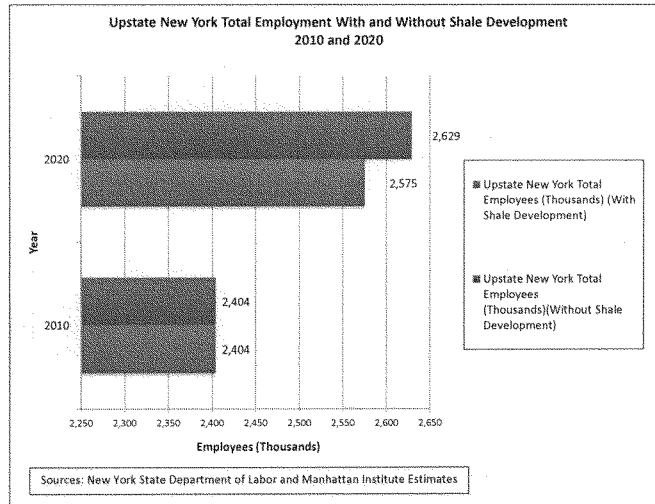


FIGURE 10

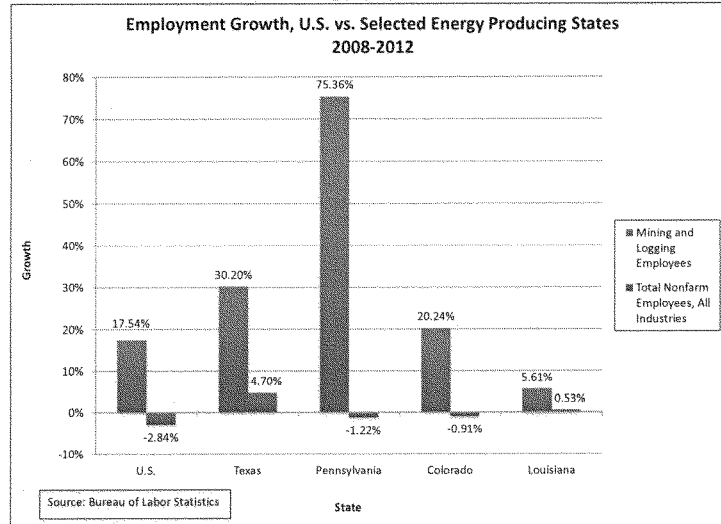
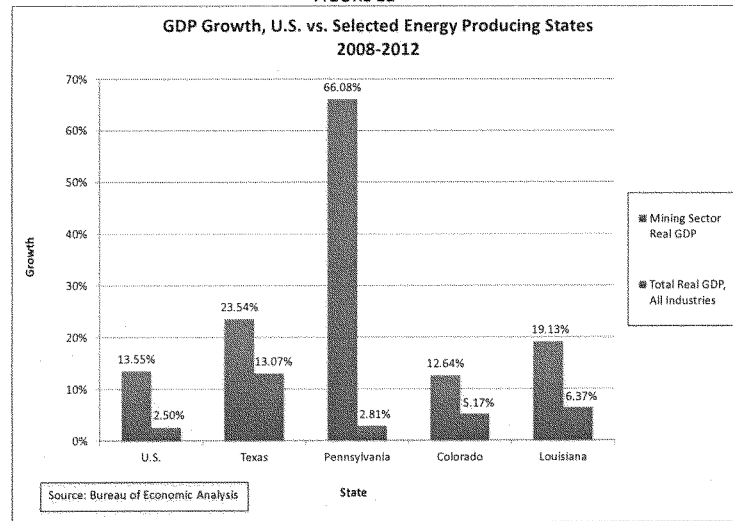


FIGURE 11



Mr. WHITFIELD. Dr. Weinstein, thank you very much. And thank you all of you for your testimony. And I think the testimony crystalizes exactly what we are trying to look at here. Those people who are most concerned about global warming are strong advocates for renewable, and I think all of us recognize we need renewables, but I don't think, Dr. Weinstein, we want to be like Europe, which is recognized as the leader of renewables in the world, and yet they are mothballing natural gas plants because the gas prices coming out of Russia are so expensive that they are building new coal plants to meet their needs. And yet in American, no one expects a new coal plant to be built right now because natural gas prices are so high, but shouldn't we have the flexibility, if gas prices go up, to build a new coal-fired plant? We don't have that ability to do it today. And would you like to make a comment on that, or—

Mr. WEINSTEIN. Well, I would generally agree with you. I do think we need standards. We need pollution standards to apply to all power-generating facilities, but what concerns me is what we hear from the administration is a policy that seems to suggest that we can get all—we can meet all of our future energy needs through a combination of conservation, efficiency and renewables. I am in favor all of those things, but that is not going to get us there. If we want to grow our economy, we are still going to need base-load power plants.

Mr. WHITFIELD. Right.

Mr. WEINSTEIN. We have to recognize that fact.

Mr. WHITFIELD. Absolutely, and I agree with you, we need standards, and we have a lot of standards, and the standards are so explicit on new coal-fired plants that the technology is not available to meet it on a large-scale basis.

Mr. WEINSTEIN. Just as an aside, I had the chief power engineer from Luminant Energy speak to my class a couple of months ago. He runs the newest, most efficient coal-fired generating plant in the country, and he said that this plant that just went online 3 years ago would not be able to meet the proposed GHG standards for new power plants that have been—

Mr. WHITFIELD. Absolutely.

Mr. WEINSTEIN [continuing]. Proposed by EPA.

Mr. WHITFIELD. That is absolutely—there is not any plant that would meet that standard.

Well, thank you. You know, a few years ago when President Obama was first elected, with the stimulus package, he talked about shovel-ready projects, and, of course, large sums of money went for renewable projects, which is fine, and we hear a lot about growth in the renewable sector, new jobs, but you all heard me in my opening statement say that today, full-time jobs are 4 million people less today than it was 4 ½ years ago.

And the question I would ask you, Dr. Weinstein, what would be our economy today if it weren't for the huge increase in oil and natural gas production from hydraulic fracturing and horizontal drilling, recognizing there has been a lot of growth in renewables, but what would our economy look like today without what is happening?



Mr. WEINSTEIN. I don't think there is any question that levels of employment would be lower, and the unemployment rate would be higher.

Let me just give you one statistic. Five years ago, the oil and gas sector contributed about 5 percent—no, excuse me, contributed about 2 percent to the Nation's economic growth. Today, the oil and gas industry alone is contributing 10 percent to the Nation's economic growth, so that is a fivefold increase.

Mr. WHITFIELD. Well, I think it is something that is quite startling; 4 million less full employed today, despite this energy boom and despite the growth in renewables, we are still 4 million less full employed.

Recently, I was talking to a CEO for a major utility in California, who was talking about the 30 percent renewable mandate in California, which is the most stringent, and he was talking about reliability and getting the electricity from where the renewables are located into the urban areas, they are having to build a new grid system, and he talked about the most recent mileage for their new grid system, the lines that they were building, was costing them \$100 million per mile, which is an astounding and astonishing figure.

Now, you mentioned, Dr.—Mr. Tanton, that you felt like the RPS, that the cost far exceeded the benefits. Would you elaborate on that just a little bit for me?

Mr. TANTON. I would be happy to, Mr. Chairman.

There are a number of unaccounted-for costs, but let me first mention that some technologies that are eligible for the RPS, their benefits are not proportional. The first wind turbine provided some level of benefits, and the last wind turbine significantly, significantly less per turbine.

So as we look at things like RPS, we need to keep in mind that just because something has done good so far, doesn't mean it is going to do good forever. It is a typical and traditional fallacy of composition.

There are a number of costs that are offloaded from the developer; things like transmission, significant cost; costs imposed for backup and balancing, significant cost. Our estimates are that those additional costs that have been offloaded to other nonparticipants effectively double the cost of wind generation, from being competitive to being essentially noncompetitive. But those—and more recently, we have been hearing about environmental externalities from some of the concentrating solar facilities in California, basically frying the birds and bats that fly around, and blinding pilots.

So there are—traditionally externalities in those costs have been focused on air emissions, either criteria pollutants or perhaps greenhouse gas emissions.

Mr. WHITFIELD. Thank you, Mr. Tanton. And my time has now expired, so maybe some of the other witnesses will get to you, but at this time, I would like to recognize Mr. Rush for 5 minutes of questions.

Mr. RUSH. Mr. Chairman, thank you so very much. Mr. Chairman, I might want to—I might remind all the members of the subcommittee that—and those who are in the audience here that, on

Tuesday, we will hear from folk where we will also have a more in-depth debate on the President's power plant plan and his common regulation, and I believe, Mr. Chairman, we are moving toward mission creep here in terms of the—today's testimony.

Today, we want to hear about innovative State strategies in incorporating renewables and energy efficiency measures.

And so, Mr. Chairman, I—with that in mind, I want to address my questions to Mr. Nadel. Mr. Nadel, what are the biggest benefits to State and Federal Governments that exists in making the country's energy network more efficient in regards to job creations, savings, environmental impact and other benefits, and at the same time you ask, what are the biggest benefits, including what are the disadvantages to investing in energy efficiency?

Mr. NADEL. OK. Yes, Congressman, yes, as you point out, energy efficiency does have enormous benefits. It reduces energy use so that energy bills go down, consumers and businesses have more money to spend on other goods and services in their businesses, et cetera. That helps create economic growth, it helps displace some demand for power. It is not going to eliminate the demand for power, but it helps reduce the demand for power, saving money, but also providing environmental benefits. So there really is an enormous multiplier from investing in energy efficiency, as many States have shown, and I think it is particularly gratifying that many of the States are actually increasing their energy efficiency activities. They are recognizing this.

You are saying what are the disadvantages? You know, a—for the consumer, not really a disadvantage. You have to spend a little time familiarizing yourself with what the opportunities are. That does take some time. Clearly, those who like to sell more energy and don't want to see efficiency, they may not be happy, but for most consumers and businesses, the benefits are quite large.

Mr. RUSH. Mr. Nadel, Dr. Weinstein was pretty persuasive in summarizing, kind of stimulating in terms of his rationing some of his conclusions. How would you address his—some of his conclusions that—particularly as it relates to economic development, job creation, and how that should impact his—America's future? If you—if we were to concentrate solely on his outlook and his conclusion without really entertaining or even discussing efficiencies—

Mr. NADEL. Can—

Mr. RUSH [continuing]. Where do you think we are going to wind up at?

Mr. NADEL. Right. I mean I think Dr. Weinstein points out that there are jobs with oil and gas development. I would agree with that. I suspect he would agree that there are jobs with energy efficiency and renewable energy. Maybe that is something we could all agree on. So that is good.

I think where we might differ is I would emphasize efficiency and renewables a bit more, particularly the efficiency because it has more jobs per million dollars' investment than just about anything else, but I would say that we do not see that, at least for the foreseeable future, we will 100 percent rely on efficiency and renewables. We definitely will need natural gas. There will be a bunch of coal plants that will continue to operate. We do see a bal-

anced energy system, although he would probably want to promote a lot more construction, particularly of new coal, than we would.

Mr. RUSH. So are we headed down this—excuse me, this path or—of either or? Any—does that make sense, or shouldn't it be both and?

Mr. NADEL. Right. I mean my hope is there is a middle ground. We can all agree that energy efficiency and renewable energy makes sense. We can all agree that we do need some oil and gas development. There may be some differences about what the appropriate rules are, but I think just about everybody would agree that, yes, we do need some oil and natural gas. There may be some differences on coal, but I think most people would agree that we will continue to use coal, it is just a question of how much. So I am in favor of trying to find that middle ground and saying it is not total, you know, left versus right, but there is something more toward the center.

Mr. RUSH. Thank you, Mr. Chairman.

Mr. WHITFIELD. Thank you, Mr. Rush.

At this time, recognize the gentleman from Illinois, Mr. Shimkus, for 5 minutes.

Mr. SHIMKUS. Thank you, Mr. Chairman.

First of all, I want to welcome my SSA young man in the front, who just showed up. I am going to meet with him after I get through these questions, and they get to observe a little bit of a congressional hearing. So—

Mr. WHITFIELD. Welcome. Welcome.

Mr. SHIMKUS. First of all, just a statement. Dr. Weinstein, you know, the President of the United States is from my home State, I am a coal-producing State of Illinois, and you shouldn't be confused; there is a definite war on coal. It has been planned by this administration, and the real proof is his—if you have never seen his response to the Editorial Board of the San Francisco Chronicle in 2008, he basically said, and on record, it is—you can check it, that his goal was to make the cost of generating electricity so high that it would bankrupt the industry.

So having said that, I understand other competitive pressures, but make no mistake, this is a designed application of Executive Branch force to destroy low-cost power and coal mining jobs in this country. And I just want to put that on the record.

Don't—now I would like to go to—I also want to raise the issue of, you know, Germany and Europe is a great example of this debate. So there is a Reuters article, April 15, that says Germany subsidizes cheap electricity for its neighbors. And in the first paragraph it just says Germany's neighbors enjoy cheap imported power subsidized by Berlin's green energy policy, and paid for by German households, analysts say. And it just goes through the debate that, obviously, we believe in all-the-above energy, and we believe that renewables can be part, but it has to be a specific portion of portfolio, and that you cannot escape the need for base-load energy, even if you are a green energy supporter, because base-load helps us with the ability for the intermittent operability of solar and wind to be applied.

I want to go to Mr. Clemmer for a first question. Has the Union of Concerned Scientists ever studied decibel output of wind genera-

tion and its effect on people in and around the area, and what a setback might be?

Mr. CLEMMER. We haven't specifically studied that issue, but there have been other studies out there.

Mr. SHIMKUS. I would ask, just for my sake, that you do that. I do have a constituent, he has been to me numerous times, he has a beautiful home. He actually was involved in the siting of these things. He was pro-wind. He has been driven out of his house. Every time I talk to this family and the in-laws, which I just did recently about 3 weeks ago in my office in Danville, they break down crying.

So I would ask that you would do that to help us bring some sense to the fact is this really an issue, and it also is an issue on the setback ratio. In the State of Illinois, we are having this debate right now that siting is approved by the counties, which I like at the local level. There is also a movement to take away the counties' ability to do this, which I would not support, but in local zoning—and the setback thing. So I would ask you to do that and consider that as your respective organization, and if you would do that, I would appreciate it.

My final questions really go to Mr. Polzin and Mr. Siegel. Deep southern Illinois also is prime for the fracking revolution. We have been a marginal oil well producer. We were one of the major oil-producing States during World War II. Of course, now there are marginal wells. We have a very aggressive State piece of legislation. Bipartisan, environmental community, and the energy community. The problem is, is that the government—the State government has delayed rollout of the rules, so the poor communities in southern Illinois aren't receiving the economic benefits that have been planned. Mr. Polzin, Mr. Siegel, what should my constituents expect once the final rules are laid out?

Mr. POLZIN. I have been looking at reasonable economies for a long time, and one thing I have learned is don't generalize. One can—different communities have different impacts. But one thing I am sure about, if you add a number of jobs paying \$100,000 a year, oil and gas jobs, it will have a significant impact on almost any community, except something that is very large where it would be diluted. Exactly how that plays out I think depends on the community. Is it a rural community, is it an isolated community, is it next to an urban area, these are all the kinds of things which determine the exact impact of that increase in new jobs. But will there be an impact? Absolutely.

Whenever you add any number of \$100,000 jobs to an area, it will have an impact.

Mr. SIEGEL. I would agree. There is a considerable impact. I think New York State is peculiar. In New York State, the desirability of \$100,000 job is contested by people who are considerably wealthier. And so I think that is a peculiar situation which is a function of what you in—you here in Congress have done with the Federal Reserve, in part, pouring money into the money center banks in New York, driving the stock market up, allowing people to invest in real estate, in buying summer homes all over upstate New York. So this is not something that is a national problem, but it is a New York problem.

In New York, we have the peculiarity of the—of people who see creating new jobs and new wealth as the problem. They want it just—things just as they are. There is a kind of reactionary quality to the liberalism in New York State.

Mr. WHITFIELD. Gentleman's time has expired.

At this time, recognize the gentleman from California, Mr. McNerney, for 5 minutes.

Mr. MCNERNEY. Mr. Chairman, my ears are burning from all the bashing of California we have heard this morning.

Mr. WHITFIELD. Don't take that personal.

VOICE. And New York.

Mr. MCNERNEY. And New York too, I hear.

But, you know, California is a big State. Some regions are suffering from a poor economy. My region, for example, has a poor economy, but I think that can be attributed largely to the unregulated financial market that caused the housing crash in 2008. But if you go to Silicon Valley, if you go to Los Angeles, the economy is booming, there are a lot of people that are coming in there with innovation to create jobs. And I can tell you high-end companies like to go where the environment is nice, and you will find that in California. So to say that the regulation is causing a job exodus, there are jobs that are coming and going in any State, so I will contest that.

Now, I also want to push back on something that Mr. Weinstein said that the Monterey shale hasn't been developed because of regulatory environment in California. The Monterey shale is a very complicated geographic feature. It is not economic to frack there yet. I mean you can put a well in, you will get some oil out, but it expires quickly because of all the stratification there. So there are some misapprehensions about what is going on in California.

I would like to follow up, Mr. Nadel, on energy efficiency. Do you have a way to estimate the return of—on investment on energy efficiency? In other words, for every dollar you invest in energy efficiency, within a 5-year period, say, what would your return on investment be?

Mr. NADEL. OK. Thank you. Yes, Figure 1 in my written testimony provides an average figure. There is a great variation. Sometimes you can get 100 percent return on investment, sometimes it is only 1 or 2 percent, but on average, we find it is typically about a 25 percent return on investment. So that is better than most other alternative investments.

Mr. MCNERNEY. So that is year and year—

Mr. NADEL. Yes.

Mr. MCNERNEY [continuing]. 25 percent.

Mr. NADEL. That would be about the average.

Mr. MCNERNEY. That would be considered a pretty good ROI.

Mr. NADEL. Yes.

Mr. MCNERNEY. And then would you please also reiterate about the kinds of jobs that are created with investments and energy efficiency.

Mr. NADEL. Yes. There are a lot of jobs, more engineering, specifying, figure-adding—out exactly what needs to get installed in a particular home or business, a lot of jobs installing energy efficiency measures. There are also jobs manufacturing more efficient

equipment, whether it is a light bulb, an air conditioner, insulation, et cetera, and then each of those jobs, they spend the money, that creates other jobs elsewhere in the economy. And then perhaps the biggest effect is that consumers and businesses save on their energy bills. They have more money to, say, to spend, to go out for dinner or whatever it is, and that helps——

Mr. MCNERNEY. And what State——

Mr. NADEL. And——

Mr. MCNERNEY [continuing]. Has the highest energy efficiency standards?

Mr. NADEL. Say that again.

Mr. MCNERNEY. What State would have the highest energy efficiency standards?

Mr. NADEL. Depends on how you look at it. In our scorecard, Massachusetts has been ranked number 1 overall. If you are you looking at savings as a percent of, say, electricity sales, Vermont has typically been the leader, although Arizona is getting very close to them. They are probably number 2 now. It—like many things, it depends on what your yardstick is.

Mr. MCNERNEY. And so are these citizens complaining about the utility bills in those States?

Mr. NADEL. Any State, you have a diversity of citizens, but no, by and large, my understanding is they don't complain.

There was actually a very interesting study that came out about a week ago that looked at energy bills around the country, and energy bills depends on both the rates as well as the consumption. And some of the States with the highest energy bills were actually States with pretty low rates, but because they often use energy inefficiently, they actually had some of the highest energy bills.

Mr. MCNERNEY. Thank you.

In California, the renewable portfolio standards initially were about 18 percent. The large public utilities easily met those standards within a few years before the deadlines and the legislature increased those standards. And it looks like they will meet those 33 percent standards easily by 2020, so the RPS hasn't been too much of a burden on the California utility systems.

Mr. Clemmer, would you please discuss the job creation effect of renewable energy in some of these States?

Mr. CLEMMER. Sure, yes. You know, as I said in my testimony, the—I mean the growth of the wind and solar industries has been tremendous over the past few years, and the jobs have followed that and, you know, frankly, the industry is growing dramatically globally and that really positions the U.S. to be able to, you know, provide—create jobs and export equipment to other countries. The fact that we are now manufacturing 70 percent or more of the wind turbine components in the United States, that is amazing. That has happened over a 5-year period. Companies have moved to the United States to do that. You know, the manufacturing jobs really have been spread out too all over the country. There is a high concentration in the Rust Belt States, in the Midwest, where there is great manufacturing capacity, but California, Texas, Colorado, Iowa, New York, I mean they are—all of these places are experiencing incredible job growth. And I would just——

Mr. MCNERNEY. Thank you——

Mr. CLEMMER [continuing]. You know—

Mr. MCNERNEY [continuing]. My time is just about over.

Mr. Chairman, we don't really need to bash renewables and fossil fuels, no need to bash each other, we can work together for—

Mr. WHITFIELD. Absolutely. Yes, we are—that is what this is all about; working together.

Mr. Olson of Texas, I recognize him now for 5 minutes.

Mr. OLSON. I thank the Chair, and welcome to our witnesses.

Last month, my local paper, the Fort Bend Herald in Rosenberg, Texas, had a story on our economy in Texas. It was another good story. It said we added over 380,000 jobs last year. That is the largest increase we have had in almost 2 decades. Most of those jobs came in the energy sector. In fact, if we were a country again, we would be the eighth largest oil-producing nation in the whole world. But as you all have mentioned, we are not just oil and gas, we are number 1 in wind production in America, and there are many reasons for that. One is our guys in Austin do a better job than people here in DC in terms of regulation. Our railroad commission, which oversees oil and gas operations in Texas, acts with commonsense and certainty to get permits approved. Our Public Utilities Commission gets power lines approved in a timely manner. They understand that protecting the public and growing our economy are not mutually exclusive.

When States or the Federal Government put up barriers to energy, they put up barriers to jobs and our quality of life. And beyond jobs, our State and local governments have seen billions in new revenues. That money has made things many—many things possible that weren't possible before. In Dimmit County, right on the border with the Eagle Ford shale play, a poor, rural school district has used revenue from the Eagle Ford to rocket them into the 21st century. Their kids can compete now in the global economy.

My first question is for Dr. Weinstein, Dr. Polzin and Mr. Siegel. When States turn their backs on energy production, what do they miss out on in terms of funding other priorities like schools, like roads? Dr. Weinstein, you are up first, my friend. And, Dr. Weinstein, speak Texan, and I can translate for everybody here if you want to.

Mr. WEINSTEIN. You know, I actually grew up here in Washington, DC, but I escaped 40 years ago.

Well, there is no question that energy development creates all kinds of benefits for the States in which they are located, for local communities, for school districts in Texas. I can remember when I first moved to Texas in '75 during the last boom, energy accounted for about 25 percent of the State's economy. Then after the bust, it was down to about 10 percent of the State's economy. Well, now, it is back up to about 15 percent of the economy, but, of course, we are a much bigger State overall. We are not just about energy, we are about high-tech and we are about healthcare and, I mean, you know, we have 26 million people.

Mr. OLSON. Yes, aerospace, you have—yes.

Mr. WEINSTEIN. And aerospace in your community. So, you know, you are talking about the Eagle Ford in south Texas, there is no question that the shale boom has done more to uplift the quality of life and the standard of living and employment opportunities in

those low-income south Texas counties than any Federal or State programs in the past. So it has been, you know, a tremendous boon to those communities.

There is an important point that I didn't have—that is kind of related to this and we need to keep in mind, is this shale boom, all of this new oil and gas production, 90 percent of it has occurred on privately owned land. Even though there is lots and lots of Federal land with shale reserves, not to mention the offshore, 90 percent of this increase is coming from private land, and that makes us different really from any other country in the world, and is, I think, largely responsible for the fact that the shale boom occurred first in the United States and not somewhere else.

Mr. OLSON. Dr. Polzin, any comments, sir?

Mr. POLZIN. I would just like to build on what Professor Weinstein said. I have here a recent release from the U.S. Energy Information Administration, and the headline is Production of Fossil Fuel from Federal and Indian Land Sale in 2013. So we are seeing a very different mix of energy production. More and more of it is coming from private land, and less and less of it is coming from Government land in one form or another.

Mr. OLSON. Yes, sir, all production in Texas comes from private land, every drop comes from private land.

Mr. POLZIN. And I would say the same thing for Montana and North Dakota. That is entirely—all of the shale oil production comes from private land.

Mr. OLSON. I am out of time. I will submit questions to the record. Thank you, Mr. Chairman.

Mr. WHITFIELD. Gentleman's time has expired.

At this time recognize the gentleman from California, Mr. Waxman, for 5 minutes.

Mr. WAXMAN. Thank you, Mr. Chairman.

In identifying the best system of emission reductions, we certainly have renewable energy and energy efficiency success stories in every region of the country. Some States are years ahead in developing a renewable energy industry, and implementing energy efficiency programs, others are just getting started. When identifying the best system of reduction under the Clean Power Plan, EPA estimated a reasonable amount of renewable energy and energy efficiency that each State could achieve.

Mr. Nadel, was EPA conservative in its estimate of how much low-cost energy efficiency is available to States?

Mr. NADEL. Yes, we do believe that EPA was conservative with its energy efficiency estimates. They assumed that every State could gradually, over many years, ramp up to 1½ percent energy savings per year, but there are several States that are already achieving over 2 percent, and quite a few others are already aiming for that. And that is just from utilities sector programs. They did not include private sector efficiency investments, such as with energy service companies, they did not include building codes, they did not include combined heat and power plants, so we believe there is quite a bit more savings available.

Mr. WAXMAN. As States look for ways to improve their energy efficiency, where should they look first? Where can they get the biggest bang for their buck?



Mr. NADEL. It is going to vary to some extent from State to State. It will often be electricity because electricity is a premium-priced energy source that is very good for highly exacting applications, but it is a little bit more expensive. Obviously, if it is a cold State, they should be looking at heating. If it is a warm State, they should be looking at cooling. There are lots of opportunities in industry, in—throughout the country, so lots of different opportunities everywhere.

Mr. WAXMAN. Mr. Clemmer, for renewables, EPA looked at what States were achieving in each region of the country, and then applied the regional estimate to each of the States in the region. Again, was this a conservative approach? Could many or most States do more at a reasonable cost, and would they benefit from doing that?

Mr. CLEMMER. Yes. EPA's approach is very conservative. It basically was—is a business-as-usual approach that says States are going to meet their RPS requirements. For some States, they had higher levels, but for the most part, at the national level, the amount of renewable energy was essentially business as usual, if States just implement their RPS's.

We did an analysis that showed that they could go twice as far as that and achieve 25 percent nationally, and achieve deeper emission reductions overall for the—for their proposals for the States. As with ACEEE, we also included higher levels of efficiency in that analysis based on what the States are already achieving. So we think it is conservative, and there are some issues in their methodology with renewables too where some States are actually producing less renewable energy in 2030 than they are today because of the methodology they applied, and so we are hoping that that gets fixed.

Mr. WAXMAN. Um-hum. Many of my Republican colleagues claim that the Clean Power Plan will hurt consumers and put a drag on the economy. I think you have heard some of them this morning. I disagree. EPA's Clean Power Plan will help drive technological innovation in clean energy and efficiency technologies. I think that will be a huge benefit to the U.S. economy, boosting manufacturing and competitiveness. And above all it will take a critical step toward cutting dangerous carbon pollution and mitigating climate change.

Do you agree with that?

Mr. CLEMMER. I strongly agree with that. In fact, our analysis, which we used the EIA's national energy modeling system to do this analysis, it was a modified version of that, we found that the benefits in 2020 were 3 times the cost, and they were even higher in 2030, and part of that has to do with implementing efficiency, which is very cheap, and cost-effective renewable technologies, but the other part of it is the public health and emission benefits both from reducing carbon, but also from reducing criteria pollutants, has a—there is a huge economic benefit to that.

Mr. WAXMAN. So do you think that some of these Republicans are just engaging in scare tactics to attack the proposal?

Mr. CLEMMER. I think there is a lot of rhetoric being thrown around, yes, and I think it would be good to have some, you know,

actual data out there to look at different alternatives to see what is the best approach for achieving the——

Mr. WAXMAN. Is looking at data the same thing as looking at evidence? Is that sort of like science?

Mr. CLEMMER. Science and economics, yes, and engineering, yes, all of that.

Mr. WAXMAN. All of that. OK, thank you.

Mr. WHITFIELD. Thank you, Mr. Waxman.

And at this time, we recognize the gentleman from Virginia, Mr. Griffith, for 5 minutes.

Mr. GRIFFITH. Thank you, Mr. Chairman.

You know, it is very interesting, it may be rhetoric to some, but I represent the coalfields in Appalachia and southwest Virginia. We lose jobs on a regular basis over the last couple of years, another 135 this week. Jobs that paid between \$75,000 and \$100,000. They are good-paying jobs in a region that doesn't have other jobs. As Mr. Siegel pointed out, Appalachia has long suffered from not having good-paying jobs, and energy extraction is one of the ways that we can offset that.

When you look at businesses closing, and you realize that these are real people and real families whose roots go back in the community for generations, it is just really hard to sit here and hear people say that there is just a lot of rhetoric out there. These are real people; people that I know, people that I care for, people that want to work and want to live in the communities in which their parents, their grandparents, their great-grandparents, and their great-great-grandparents have lived in. And everybody always wants to say, well, we can shift or we can alternate to something else, but, you know, my region also heard those same arguments on furniture manufacturing and textiles and tobacco. Those were our big industries in the region, along with general agriculture and some other things thrown in. And now, as Dr. Weinstein said earlier, he is not sure whether there is a war on coal. I can assure you there is. Living in the middle of the fields out there and seeing the people who are affected, there is a war on coal.

But I would have to ask you, Dr. Weinstein, when you are losing these jobs, that clearly affects the economy of my region, but you indicated, and I think you are correct, that when you put the pressures on coal that have been placed on coal over the last few years, you are going to drive energy costs up. Is that not correct?

Mr. WEINSTEIN. I would say that, you know, other things being equal, if coal is going to contribute less to the power grid, and other forms of energy are more expensive, then obviously that is going to be passed on to businesses and consumers. So that is why I argue that we—that EPA and other regulatory agencies need to proceed with caution, with a rule of reason when promulgating these, you know, the final rules——

Mr. GRIFFITH. And I would agree.

Mr. WEINSTEIN [continuing]. Of the greenhouse gas emissions.

Mr. GRIFFITH. And I would agree. We have to proceed with reason and with caution, and to make sure that we let the science get in front of the regulations, and not have the regulations in front of the science. And I couldn't agree with you more, which is why I have supported clean energy technology and clean coal tech-

nology, because we have to continue to do the research, but we cannot eliminate coal, which seems to be the goal of this administration, without having that passed on to the consumers. And interestingly, the President said so in his 2008 interview with the San Francisco Chronicle. He said these costs will necessarily be passed on to the consumers. What people often forget is they are the consumers. And when those consumers happen to be large manufacturing facilities, and their facilities start to age, wouldn't you agree that some people, depending on the product being manufactured, would have to look at areas of the world where they can compete better because we have driven our energy costs up. Wouldn't you agree with that, Dr. Weinstein?

Mr. WEINSTEIN. No, that is absolutely true, and one of the reasons we are seeing a revival in this Nation's manufacturing base is because our power costs, our energy costs in general are lower than in most other countries. That is one of the reasons that we find companies from Germany, where power costs are so high, moving their operations or expanding in places like Texas and Louisiana. So in a perverse way, that is kind of good for the U.S.

Mr. GRIFFITH. Yes.

Mr. WEINSTEIN. Something important hasn't been mentioned today, and that is the—you would think that the United States is an energy wastrel, but we are not. We have improved energy efficiency more in the United States than in any other country over the last 30 years. Today, we get \$1 of economic output with half of the energy input that was required 30 years ago, and we need to keep that in mind. We have made tremendous progress in terms of energy efficiency.

Mr. GRIFFITH. And we have, and we can do that and continue to use coal as well, and we should improve on all aspects of our energy, and we should always be looking for ways that we can make it more environmentally friendly.

With that, Mr. Clemmer, I would ask, have—has your group studied the impact of wind on birds? And Mr. Shimkus mentioned earlier the impact with the sound, have you all studied that impact, the loss of life to numerous species of birds?

Mr. CLEMMER. We are part of the National Wind Coordinating Collaborative that thoroughly researched that issue and found that the impacts on avians from wind turbines are relatively small compared to other things, including—

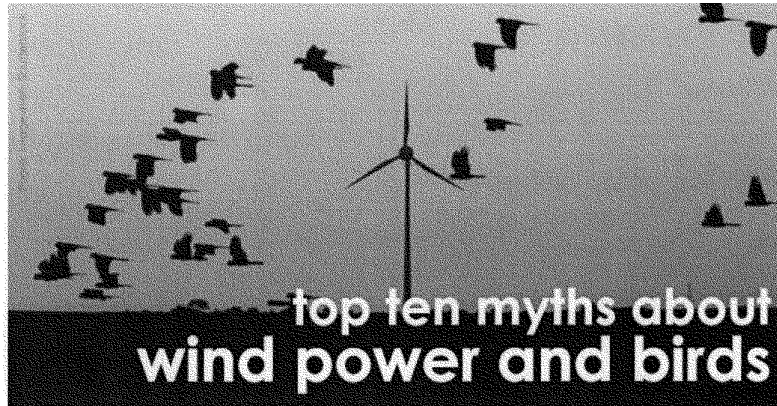
Mr. GRIFFITH. And it may be—

Mr. CLEMMER [continuing]. Fossil fuel development, and coal and nuclear plants.

Mr. GRIFFITH. And it may be relatively small compared to some other things in your opinions, but I would have to say there are some opinions that, while agreeing that some fossil fuels have issues as well, wind needs to do better siting, et cetera, and I would ask that we include into the record, Mr. Chairman, if we could, the spring edition of the magazine of American Bird Conservancy—yes, I know it probably shocks my colleagues I read this on a regular basis—in which it includes an article on the top 10 myths about wind power and birds.

Mr. WHITFIELD. Without objection, we will enter this into the record.

[The information follows:]



Every now and then it helps to “hit the reset button” on bird conservation issues. That makes it easier to find and fix false statements and misleading assumptions that can make these issues more contentious than they need to be. Take wind power, for example. Is it always “green?” Does it kill a lot of birds? If it does, is that the price the nation needs to pay for clean energy?

Dr. Michael Hutchins, National Coordinator for ABC’s [Bird Smart Wind Energy Campaign](#), says those are some of the wrongheaded notions now embedded in the national debate about the potential threats that poorly sited and poorly operated wind facilities pose to North American birds. In an effort to move past them, Hutchins has identified the Top Ten Myths involving wind power and birds. Here they are, in reverse order.

**Myth #10: There Are No Good Estimates of Bird Kill Numbers in the United States.**

True, if by “good” you mean “definitive,” but false if you are trying to imply that there’s no evidence that the nation’s wind power facilities are killing significant numbers of birds. And, even more incorrect if you’re trying to imply that there there’s no reason to believe that these numbers will not skyrocket in the near future.

In 2009, the U.S. Fish and Wildlife Service (FWS) estimated that 440,000 birds were being killed each year at the nation’s wind facilities. Four years later, a [peer-reviewed study in the \*Wildlife Society Bulletin\*](#) raised that estimate by 30 percent, to 573,000 bird fatalities a year at 2012 build-out levels.

The author of the study noted that his estimates may be low. In particular, research has suggested that the carcasses of birds killed by wind turbines may be carried off by scavengers much more rapidly than has been supposed. In addition, different observers may detect carcasses at different rates, introducing observer bias. Such estimates also do not include the birds killed by collisions or electrocutions at associated transmission lines.

There is an urgent need to develop bird kill estimates that are more precise and credible. This could be done by making it easier for independent researchers to gain access to wind power facilities and by requiring that a standard research protocol be used. New technologies involving a combination of auditory cues and thermal video could be a game-changer because they automatically record bird strikes at both wind turbines and transmission lines in real time and are relatively inexpensive.

The number of birds killed by wind energy is expected to balloon to 1.4 million if the wind power industry meets ambitious production goals developed by the U.S. Department of Energy and the Obama White House. That expansion effort could require a ten-fold increase in the number of U.S. wind turbines in the next 15 years.

**Myth # 9: Wind Power Companies that Violate Bird Protection Rules Are Routinely Punished.**

Since the 1980s, only one wind facility has been successfully prosecuted for violating federal rules and permitting guidelines designed to limit bird kills at the nation's wind power complexes. The wind company in question was a Wyoming facility owned by Duke Energy, which also produces oil and gas. The Justice Department accused Duke of violating several bird protection rules between 2009 and 2013, after the discovery of 14 Golden Eagles and 149 other protected birds at the "Campbell Hill" and "Top of the World" wind energy plants in Converse County, Wyoming. As part of a settlement announced last fall, Duke Energy agreed to pay a total of \$1 million in assorted fines and mitigation. That's a tiny fraction of \$3 billion in profits reported by the company in 2013.

There are thousands of wind power facilities in the United States. Many of them have been accused repeatedly of violating federal bird protection laws. But it's not clear whether any of those investigations will lead to prosecutions linked to bird mortality. In addition, I know of no cases where a particularly lethal facility, such as the notorious Altamont site in California or the Criterion site in Maryland, has been shut down following an abysmal record of bird and/or bat kills.

Representatives of the wind power industry sometimes argue that this dearth of prosecutions shows that the nation's wind facilities are remarkably bird-friendly, but at ABC we disagree. What these numbers really show is that the nation's largely voluntary bird protection regulations are embarrassingly weak and ineffective. Currently, most of these regulations only take effect when wind power companies "self-report" potential violations of bird safety laws.

We suspect that those self-reporting rules have encouraged many companies to keep potentially troublesome bird kill numbers to themselves. It's worth noting that if the Duke Energy facilities had not volunteered their bird kill data to federal regulators, the number of bird safety prosecutions linked to U.S. wind plants could still stand at zero.

**Myth #8: The Potential Impacts of New Wind Plants Are Always Studied in Advance.**

Recently, a 300-foot-tall wind turbine was put up at the Lake Erie Business Park near Clinton, Ohio, and another lies on the ground waiting to be erected. Four more turbines are proposed, and all of them are near important migratory flyways. Being on private land, the owners of these turbines were not required to study the potential impacts of this project on native birds for federal or state regulators.

The fact that wind plants on private lands do not require federal approval is disturbing. Native birds are not the private property of the for-profit wind industry, especially when they are building turbines that kill birds. Native birds are public treasures, owned by the American public and held in trust for current and future generations.

**Myth #7. Conservationists Have Stunted the Growth of the Wind Power Industry.**

The amount of energy generated by the nation's wind power facilities has risen dramatically in recent years, from a total of 2,539 megawatts in 2001 to more than 60,000 megawatts in 2012. In the fourth quarter of 2012 alone more than 8,000 megawatts worth of turbines were constructed in this country.Â Generally speaking, this is not an industry whose growth has been stunted by environmental concerns.

There's no doubt that local bird conservation groups have helped draw national attention to the threats that badly sited wind facilities pose to native birds. A few poorly sited proposed facilities have been abandoned after questions were raised by local citizens groups, often with help from ABC. But many more facilities have been approved and an enormous number of projects are now being planned, even in the most sensitive of bird habitats and migratory routes.

**Myth #6: Bald and Golden Eagles Use Their Incredible Eyes to See Wind Turbines Coming and Avoid Them.**

Theoretically, the nation's Bald and Golden eagles are extremely well protected: According to federal regulations, wind power companies cannot kill a single one of these birds unless they have been granted an "incidental take permit" authorized by FWS. Those permits allow specific wind plants to "accidentally" kill the protected birds while generating power. Recently the FWS triggered a storm of controversy by extending the maximum length of these take permits to as many as 30 years from the old limit of five, after heavy lobbying by representatives ofÂ the wind power industry.

ABC recently announced that it will be suing the Department of the Interior over the ill-conceived regulation, citing violation of the National Environmental Policy Act, the Endangered Species Act, and the Bald and Golden Eagle Protection Act.

Some supporters of this rule change argue that because eagles have remarkable eyes they're able to avoid the turbines. And there is no doubt that eagles have amazing vision. For example, it's likely that Golden Eagles can see rabbits hiding in the brush while soaring a mile above the ground. But the notion that these birds see turbines and avoid them is unproven at best: since the 1980s, the turbines at California's Altamont facilities alone have killed more than 2,000 eagles, and there are good reasons to suspect that this that this kill estimate is low. Eagles hunt while soaring, often well within the range of long, thin turbine blades that can rotate at as many as 170 miles an hour. Many eagle experts say it's likely that these birds keep their eyes locked on the ground (where the prey is) while soaring. If true, then eagles may be even more vulnerable to collisions than we know, especially when the wind turbines putting them at risk are built in or near important raptor hunting grounds, densely populated with ground squirrels or other small prey, as is the case in Altamont.

#### **Myth #5: Everything about Wind Power is "Green."**

Wind power facilities are "green" in the sense that they do not produce air pollution. But it's been clear for decades that when these facilities are built near migratory pathways, breeding areas, and other bird-rich locations, they pose very real threats to federally protected birds and bats. Those facilities are not "green" unless birds and bats do not count. They do.

As referenced in #6, the country's most notorious example of how "bird-unfriendly" badly sited wind facilities can be is the 5,400-turbine complex built in 1981 near Altamont, California, in an area known at the time as both a migratory corridor and as a hunting ground for Golden Eagles. Upward of 2,000 Golden Eagles and thousands of other birds have been killed by the blades of these turbines.

Spokesmen for the wind power industry say they've learned how to steer clear of important bird habitats. Those claims have been called into question in Somerset County, Maryland, where plans are being laid to build 26 turbines near a major nesting area for Bald Eagles.

In central Wyoming, the owners of the proposed Chokecherry-Sierra Madre complex want to raise as many as 1,000 turbines in an area important to Golden Eagles and Greater Sage-Grouse. And a major wind facility may soon be constructed in the middle of a migratory route in Kansas used by the world's only remaining population of wild Whooping Cranes.

We could probably add scores of other controversial wind power proposals to this list and still have some to spare.

#### **Myth #4: Modern Wind Facilities Use New Technologies to Minimize Bird Kills.**

This is often represented as a fact by spokesmen for the wind power industry, who suggest that modern wind facilities come equipped with sophisticated bird-tracking radar systems and other technological “bells and whistles” that help limit bird kills. Some of these technologies are potentially helpful, but none of the important ones have been independently tested for effectiveness.

For example, there’s no solid evidence that high-tech radar systems will be able to accurately detect oncoming flocks of protected birds, or to do that quickly enough to close down turbine complexes in time to avoid bird deaths. No more than a handful of wind power facilities are even experimenting with these systems. To my knowledge, few wind facilities are currently planning to install these technologies, as they are expensive.

Another version of this myth holds that taller, more efficient “monopole” turbines are easier on birds than the less efficient older “lattice” turbines in places such as Altamont. Recently, this argument was undercut by a [study of American bird kills](#) linked specifically to monopole turbines. That report concluded that the newer, taller monopole turbines may actually be more dangerous, primarily because bird kills were found to be greater at taller turbines. In the last 10 years alone, the average height of turbines used at U.S. wind facilities has increased by 50 percent, and this trend is almost certain to continue. The blades on the world’s largest wind turbine, now being tested in Denmark, are a staggering 718 feet tall.

### **Myth #3: Offshore Wind Facilities Kill Fewer Birds.**

At the moment it’s extremely difficult to estimate the potential impact of offshore wind facilities on birds. For example, how does one develop site-specific estimates of bird collisions when carcasses land in open water and either sink, get carried off by tides and currents, or are eaten by predators? And if there are no carcasses, how can wildlife protection laws be effectively enforced?

Bird experts don’t know the answers to those questions yet. But it’s fair to say that nothing they have learned so far suggests that offshore wind facilities are always better for birds. In other words, there’s some reason to believe that offshore facilities built in migratory pathways may be just as deadly as badly sited onshore plants.

For example, in recent years, the claim that offshore wind facilities will kill fewer birds has been used to support a series of proposals to build facilities off the southern coast of Texas in particular, even though vast numbers of declining bird species fly through those waters twice a year, while migrating back and forth between breeding grounds in North America and wintering grounds in the Caribbean and Central and South America.

Projects such as these should be moved to the back burner until we’ve learned more about the potential threats that offshore wind facilities pose to birds, and much more about how to keep offshore bird kills to a minimum through proper siting and mitigation. There’s no reason to repeat the same mistakes we’ve made with land-based wind plants.



**Myth #2. Wind Power Facilities Can't Hide Bird Kill Numbers from the Public.**

Since the 1980s, federal "Right to Know" laws have been used to drive pollution levels down at many of the nation's factories and chemical facilities, even when those emissions were within federal guidelines. Basically those rules mandated that regular pollution readings taken by government regulators or independent experts be made easily available to anyone who wanted to see them. Nonprofit watchdog groups have used this information to "shame" factories with high pollution levels into finding cleaner ways to make their products. Some of these same companies have also been punished in the marketplace by competing businesses that made it known that their facilities were "cleaner."

Sadly, very different rules are now being used to govern bird kills at our nation's wind facilities. The current rules allow contracted employees of wind facilities to collect and report potentially embarrassing bird kill data. This self-reporting of bird fatalities also makes it easier for wind power companies to hide their findings or consciously deceive the public and regulators, covering up potential violations of federal laws including the Endangered Species Act, the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.

In addition, data sent to regulators at FWS is often treated as "proprietary information"—an industry catch phrase that implies that the public has no right to see it; ridiculous, yet true. We should add that in 2011, ABC asked FWS to release some bird kill data that had not been made available to the public, under the terms of the Freedom of Information Act (FOIA). Three years later, we're still waiting. ABC was forced to take legal action in an attempt to obtain the data we requested because the public has a right to know.

Defenders of these business-friendly rules and regulations sometimes say they are the only way to stop competing businesses from using bird kill data to gain a competitive advantage in the marketplace, but that's exactly what for-profit businesses should be doing. The voluntary and secretive nature of existing bird protection rules makes it impossible to know whether bird kill data gathered at specific wind plants is accurate or credible, if it is gathered at all. These rules are highly problematic.

Indeed, the nation's native birds are not the property of for-profit wind companies, but are a collective resource of the American people and held in trust for current and future generations.

**Myth #1: Bird Kills Linked to Wind Power Are the Price We Have to Pay to Combat Global Climate Change.**

If just one myth is dispelled, I hope it is this one, partly because it has been endorsed by the leaders of some of the country's better-known environmental groups. Though they might not say so for the record, these good people seem convinced that massive bird deaths linked to turbines will be one of the inevitable side effects of a successful effort to reduce emissions of fossil-fuel pollutants linked to global climate change.

However, ABC is convinced that better siting regulations and tougher bird protection rules would make it much easier for wind power companies to build Bird Smart facilities. Fully tested, mandatory permitting regulations leading to proper siting of new facilities and appropriate, effective mitigation would make them much better for birds—and in the long run, for people, since many birds play key roles in the ecosystems on which people depend.

We've written a letter to Interior Department Secretary Sally Jewell, encouraging her to conduct a national programmatic wind Environmental Impact Statement. The results could help identify, once and for all, locations that the industry should avoid completely and others where the risk to public trust resources, including native birds, is low. ABC's Wind Development Bird Risk Map could be useful in this regard, but there are many other considerations, including impacts on other wildlife species.

Let us not forget that one of the most pressing problems linked to climate change is the loss of precious plants and animals, including many irreplaceable and ecologically vital birds. A rapid, headlong, and irresponsible expansion of the nation's wind facilities could result in further declines in our nation's bird populations in the very near future, especially when the damage done by badly sited wind plants is combined with the damage done by habitat loss and other human-caused threats such as window collisions and predation by outdoor cats.

Finally, if our use of fossil fuel is not decreased proportionally with the growth of renewable energy—which is not currently happening—we still won't solve the climate change problem, and thus far, the wind energy build-out has not decreased our use of fossil fuels. Our use of coal, for example, has actually increased.

We can do better than that.

*ABC's efforts to establish Bird Smart wind energy in the U.S. are made possible in part by the generous support of the Leon Levy Foundation.*



*Michael Hutchins earned his Ph.D. in animal behavior at the University of Washington in Seattle. Prior to coming to ABC, Michael served as Director, Department of Conservation and Science, at the Association of Zoos and Aquariums and Executive Director/CEO at The Wildlife Society. He has authored over 220 articles and books.*

Mr. WHITFIELD. The gentleman's time has expired.

At this time, we recognize the gentleman from Texas, Mr. Green, for 5 minutes.

Mr. GREEN. Thank you, Mr. Chairman, and the ranking member for holding the hearing today.

The recently finalized EPA carbon rule has raised some questions, and hopefully, through a series of hearings, we can get answers.

Before the 4 blocks of the rule for existing power plants were proposed and finalized, Texas is doing its part to reduce carbon emissions. Thanks to the rapid increase and production of natural gas from the Permian Basin and the Eagle Ford shale, we have been a leader in fuel switching. Thanks to an abundant wind resource, Texas now has more than 14,000 megawatts of wind power. Both of these resources are supplanting coal as our base-load fuel. On the energy efficiency front, Texas has been a leader as well. For older buildings, Texas has passed laws to encourage retrofits and increase access to financing. For the new buildings, Texas put the 2009 Energy Conservation Code into effect that requires 15 percent more efficiency. Our city of Houston is the leader in Texas by requiring an additional 10 percent above that 2009 code. However, in the utilities section, there is—may be some room for improvement, and that is how we improve that interests me.

I support the EPA's mandated duty to regulate carbon. The recent rule has raised some eyebrows, not just amongst the regulated entities, but across the board. I have particular interest in block 4 in the energy efficiency block, and we have reviewed the rule and the EPA calculations. There are some questions I would like to have answered.

I am happy the panel is before us, and I believe we can answer some of the questions that relate to the States.

Mr. NADEL, energy efficiency is often called the silent fuel. You state in your testimony that energy efficiency should be the cornerstone of all-of-the-above energy policy. The ACEEE has created a State efficiency standard scoreboard which examines 29 variables in 6 categories. Does the ACEEE scorecard offer a statewide annual electric savings rate?

Mr. NADEL. No, we haven't—wait, yes, it does. We do provide that figure for each of the individual States. It is on Table 14 of our most recent one.

Mr. GREEN. OK.

Mr. NADEL. If you have a question about a particular State, I would be happy to answer it.

Mr. GREEN. The ACEEE rates California as number 2, is that correct?

Mr. NADEL. Overall, yes.

Mr. GREEN. OK.

Mr. NADEL. California was number 2.

Mr. GREEN. Do you have a sense of California's annual savings rate?

Mr. NADEL. California, for electricity in 2011, which is the numbers I have in front of me, saved 1.35 percent of their electricity through energy efficiency.

Mr. GREEN. OK.

Mr. NADEL. They were fourth in that category.

Mr. GREEN. EPA believes that, ultimately, States can reasonably achieve a 1.5 percent savings rate per year. Is that generally correct?

Mr. NADEL. Yes, they do.

Mr. GREEN. If California ranks number 2 with approximately 1.3 annual savings, how do the bottom third of the States reasonably achieve 1.5?

Mr. NADEL. California's overall number too, they are not as high as in the electricity savings. In terms of States that are already doing the 1.5, that includes Arizona, Massachusetts, Rhode Island, Vermont, are all achieving those already, and there are several other States that plan to do it in the next year or 2.

Mr. GREEN. In your testimony, you state the Federal Government can help and encourage States through guides and assistance. What types of the policy or guides are necessary to achieve that 1.5 percent?

Mr. NADEL. Mainly, it will have to come at the State level. They will have to work typically with the utilities to offer energy efficiency programs for consumers and businesses. Federal Government can provide technical assistance, information on best practices, those types of things I think would aid the States to do what they can do.

Mr. GREEN. The EPA's technical support documents show that engineering-based studies state that the maximum achievable energy efficiency goal is .5—0.5 percent annual savings rate. How does EPA achieve the 1.5 percent when various engineering and—based studies state that the—that level is not possible?

Mr. NADEL. Many of the engineering studies that I am familiar with show that 1.5 or even 2 percent or higher are possible, as witnessed by the fact that a number of States are actually achieving that.

Mr. GREEN. OK. Do pollution controls affect the power plants' energy efficiency?

Mr. NADEL. Yes, they do a little.

Mr. GREEN. OK, do pollution controls actually lower the efficiency of the power plants?

Mr. NADEL. Commonly, yes. It varies from plant to plant.

Mr. GREEN. OK. Can residents or customers achieve enough energy savings through appliances and thermostats to offset loss of the power plants?

Mr. NADEL. I haven't done those calculations. I would want to enter—

Mr. GREEN. Mr. Chairman, I know I only have 9 seconds left, but I would like to ask Mr. Tanton, in your statement, the—you say that production tax credit has led buildings and enormous amounts of variable and volatile electric—electrical generation, threatening State reliability to the electrical grid. How does enormous amounts of volatile production lead to problems with the State grid? It seems like if we are producing more, it would give more certainty to the grids.

Mr. TANTON. Well, you need to keep supply and demand in perfect harmony. So as more volatile generation comes online, less

volatile or more stable generation has to go offline, but they have to be standing-by. They have to be idling, as it were.

Mr. GREEN. Yes.

Mr. TANTON. And in that operation, it threatens the grid because they can't respond fast enough. They can respond fast enough if you have a little bit of wind or solar on the system, because the typical marginal unit is a fast-responding combustion turbine or something like that. If you have a lot of variability from the wind, then you start dispatching your base-load units, which can't respond fast enough. If you can't respond fast enough, the grid suffers a shortage, i.e., a blackout or brownout.

Mr. GREEN. Well—

Mr. WHITFIELD. The gentleman's time has expired.

Mr. GREEN. Thank you, Mr. Chairman. Obviously, it is a great panel.

Mr. WHITFIELD. At this time, we recognize the gentleman from West Virginia, Mr. McKinley, 5 minutes.

Mr. MCKINLEY. Thank you, Mr. Chairman.

Dr. Weinstein, with all due respect, you had said—you used the word hyperbolae about the war on coal, and I really want to reinforce what has been mentioned by a few of the people that preceded me, that there is a war on coal, and anyone needs to come to the coal producing areas around this country and understand what is going on for this war on coal. The uncertainty that is swirling about the industry, even the gas industry is now becoming more concerned that once they—once the EPA's successful battle on coal, it is going to switch over to them next. And—because my—the—I think the general understanding is, for those of us in the energy fields, that the—this administration believes that we can have higher utility bills. We should be able to—I have heard them refer to Europe, the European bills are higher so, therefore, we can afford it. I just want to get past that it is not hyperbolae, it is real, and it—

Mr. WEINSTEIN. Well, you understand that I am a dispassionate academic, so, you know—

Mr. MCKINLEY. Well—

Mr. WEINSTEIN [continuing]. I have to base my comments on facts.

Mr. MCKINLEY. I am engineer, and I base my facts—on facts and real life, not academic. I am facing those families that are struggling, that are unemployed, that are—they are worried about what is going to happen next to them. I have—in eastern Ohio where we have an aluminum plant with approximately 1,000 employees gone because the cost of electricity, they can't produce it, they can't produce aluminum, because aluminum—about 60 percent of the cost of producing aluminum is electricity, and when that rate continues to hike because of what policies we are setting here at the Federal Government level, we are putting them out. Ravenswood, the same thing; 1,000 employees down there. It is just having a startling effect, so I just wanted to build off this, these Federal policies, how Federal policies are affecting States. They are affecting States. And the coal industry, for all of you to understand, my grandfather was a coalminer and so I can relate very comfortably to what this is doing. When you shut down a coalmine because of

the structure that we are doing here in Washington, you are affecting not only the coalminer, but you are affecting all those related industries that are involved with—the timber industry, the concrete industry, the machinists, the building, the machinists, all the people that are involved in, let alone the jobs that are on the outside industry. So we have to be very careful of the policies that we set.

But let me return back, if I could, to the—what I understand is the headline of this meeting, is the economic impact of State energy policies. And each of you have presented some very interesting scenarios about your research into the—what the States are doing, as laboratories of democracy with this. So if I could go down a list with each of the 6 of you, would you give us, in a short time frame, what would be the number 1 thing that we should learn from your research? One thing, and I will start with you, Mr. Tanton, what would be the number 1 action statement that we should be listening to in Washington to what you have learned, and what is your opinion? Just 1 thing.

Mr. TANTON. There are so many things, but if you—

Mr. MCKINLEY. All right, I—

Mr. TANTON. If you ask for 1—

Mr. MCKINLEY. Try and limit to 1.

Mr. TANTON [continuing]. I will give you 1. Separate the end goal from the mechanism of achieving it. Keep in mind as you do that that economic forecasts are forecasts, they are not answers, they raise questions. You have heard a lot of estimates of forecast this morning. I would argue they should be used to raise questions, and build in contingencies in your policies and automatic off-ramps.

Mr. MCKINLEY. Thank you. Mr. Siegel?

Mr. SIEGEL. I would suggest that—

VOICE. Microphone.

Mr. MCKINLEY. I can't—I am sorry.

Mr. SIEGEL [continuing]. And that energy—thank you—energy is important for reducing inequality, and that the places that produce high costs of energy like California have enormous—or New York, have enormous, enormous inequality, and they are ill suited to lecture the rest of the country—

Mr. MCKINLEY. All right.

Mr. SIEGEL [continuing]. On how we should proceed.

Mr. MCKINLEY. Thank you. Mr. Clemmer?

Mr. CLEMMER. The most important thing from my perspective is that we need to transition even further than we have gone to low carbon energy, whether that be using carbon caption storage with coal or natural gas, producing low-carbon energy from renewables, nuclear power, we need—the costs of climate change are just too tremendous, and we are already seeing that with the cost of extreme weather on the increase and the frequency happening, and so we need to move in that direction.

Mr. MCKINLEY. Steve?

Mr. NADEL. Yes, I would note that energy efficiency typically provides about a 25 percent return on investment, and is very labor-intensive and is particularly good at generating jobs.

Mr. MCKINLEY. OK.

Mr. MR. POLZIN. The local economic impacts of energy development are real and they are significant. There are some supposedly—there are some negative aspects. For example, housing in rural areas, but the benefits, the increased wages and employment, provide resources that we can address these other effects.

Mr. MCKINLEY. OK. Dr. Weinstein?

Mr. WEINSTEIN. I would argue that when it comes to energy development, if there is no evidence the States are doing a poor job, the Feds ought to stay out of the way.

Mr. MCKINLEY. Thank you.

Mr. WEINSTEIN. And secondly, it is time to remove all restrictions from the export of natural gas and oil.

Mr. MCKINLEY. OK.

Mr. WEINSTEIN. And coal.

Mr. MCKINLEY. Thank you very much.

Mr. WHITFIELD. Gentleman's time has expired.

At this time, recognize the gentlelady from California, Mrs. Capps, for 5 minutes.

Mrs. CAPPS. Thank you, Mr. Chairman, for holding this hearing and for collecting together such an interesting panel. I want to thank each of you panelists for your testimony.

I think we would all agree that fossil fuels are a finite resource, which means that sooner or later we will have no choice but to find alternative energy sources. Knowing this, I believe we owe it to our children and grandchildren to begin moving in that direction now, rather than waiting years down the road when it may be too late. My home State, which has gotten some attention this morning, California, understands this and has been a leader in implementing clean and sustainable energy policies. Setting renewable production standards and increasing investments in energy efficiency are 2 of the more critical elements of these policies. These policies have paid significant dividends for my State and for my district, which is on California's central coast. For example, my district is home to 2 of the largest operating solar farms in the world, and more are on the way. Together, the California Valley Solar Ranch and the Topaz Solar Farms in eastern San Luis Obispo County are already generating well over 550 megawatts of electricity, and powering hundreds of thousands of California homes. These projects created hundreds of local jobs as they were being built, and still do, and injected hundreds of millions of dollars into our local economy. One of these projects used Federal loan assistance, and the other was financed entirely with private capital.

It seems to me that at least in my district, California's policies were key drivers of economic growth and private investment.

And my question, Mr. Clemmer, I am hoping you would agree, I am assuming you would, but I wanted you to talk briefly about the ways that Government policies can support renewables and impact private investments in renewable energy projects. How is this partnership going to work?

Mr. CLEMMER. Thanks. Yes, good question. So, yes, I mean I would agree, as my testimony alluded to, that projects like that in California and other States around the country are being driven in large part by State renewable electricity standards, which have been beneficial in not only deploying the technologies, but driving

down the cost. And we have seen that dramatically with wind and solar PV in particular that that is happening.

The Federal policies, I think, to learn from the States, is we need long-term, stable, predictable policies to facilitate that investment, to continue to invest in manufacturing. The production tax credit has been a good policy, but the short-term extensions of it has created a boom-bust cycle that has not been good for the industry.

Mrs. CAPPS. Yes.

Mr. CLEMMER. We need something that is longer term, whether that be a longer-term tax credit, whether that be a national renewable standard is something we have been advocating for for years, where UCS and EIA have done many analyses over the last 15 years showing large national benefits to adopting a national renewable standard.

Mrs. CAPPS. I agree with you. And I have a question now for you, Mr. Nadel. My district has also seen significant economic benefits from California's strong energy efficiency standards. These standards have driven researchers and entrepreneurs to innovate and develop new products to meet these standards. We have at my home institution at UC Santa Barbara, the Institute for Energy Efficiency, which is dedicated entirely to developing cutting-edge energy efficiency technologies. And we also have private companies, for example, like Transphorm, which is a global leader in energy-efficient power conversion technologies.

I believe there is a clear link between strong energy efficiency standards and innovation.

So could you elaborate on this? I have a little bit of time left. How do innovators benefit from strong energy efficiency standards? Is this the winning path for the future?

Mr. NADEL. Yes, we do believe there is. Lots of new technologies keep being developed all the time. You have pointed out some. Just to mention 2 technologies that were developed first in California, electronic ballasts which now power all the fluorescent lamps, as well as low emissivity coatings on windows that help keep some of the heat out. Those are examples.

Another area where California has really been leading is what we call intelligent efficiency. It is that marriage between energy efficiency and Silicon Valley, if you will. How do we use information and communication technologies to understand where the energy is being used in real time and immediately correct it, either automatically or by giving information to the operator.

So sometimes people talk about energy efficiency being the low-hanging fruit. Fortunately, the fruit keeps growing back on the trees as, through research, as you pointed out, we keep developing new ways to save energy.

Mrs. CAPPS. Thank you. Yield back.

Mr. WHITFIELD. Gentlelady yields back.

At this time, recognize the gentleman from Texas, Mr. Barton, for 5 minutes.

Mr. BARTON. Mr. Chairman, I—Mr. Terry got here before me. I would—

Mr. WHITFIELD. Well, they tell me that you had been here earlier, so if you are going to yield—

Mr. BARTON. No, I am—



Mr. WHITFIELD [continuing]. To Mr. Terry——

Mr. BARTON. I am happy to let Lee go and then——

Mr. WHITFIELD. All right.

Mr. BARTON [continuing]. I will be the cleanup——

Mr. WHITFIELD. Recognize Mr. Terry from Nebraska for 5 minutes.

Mr. TERRY. Be the closer.

Mr. BARTON. That is right, baby.

Mr. TERRY. That is awesome. So a little over a year ago, our chairman led a group of us on this side of the aisle, not on tax dollars, to go to western North Dakota, and it was educational in the sense that we went from the very beginnings of a project, all the way to when it is just pumping and it is—all the construction has finished. And it was extremely interesting to see what little footprint there is after the construction has finished and it is just pumping and pumping and pumping. But one of the things that really stood out to me, especially when we were talking to the workers there, is how highly paid they are. And I think that is a product, probably, or market, free market, you know, when someone is in demand, they can garner higher wages. But as Ed can testify to, we were being told that just a lumper that unloads and loads trucks for a warehouse in that area of North Dakota earns \$60,000 to start.

Now, we talked to some of the folks that were putting together the drilling rig, and they were in the 6 figures. So it is incredible to me the high wages, and the number and volume of young people, men and women, that are there for the good wages. And I think that is one of the things that we don't think about when we talk about the gas and oil production in the United States, is it is a way of elevating lower income workers to higher wages. And, frankly, it is interesting that a machine operator is making virtually—not virtually, is making 80 percent of what a United States Congress is making. That is awesome.

So, Mr. Polzin, your area of expertise is in the economics that this brings. What is the—looking at something like Pennsylvania and North Dakota, and the economic driver of the oil boom and gas boom, can you tell us what impacts that really has, not only on the local economy, the State economy, but the national economy, that one—that guy that was running the machinery, making \$130,000, \$140,000 a year, what is the multiplier effect of that? Mr. Polzin—Dr. Polzin.

Mr. POLZIN. When you look at a local economy——

Mr. TERRY. Microphone.

Mr. POLZIN. When you look at a local economy, it—the actual impact will vary depending on a number of factors, but if you—the real specific question is what is the multiplier for an oil and gas job, I would have to go back and look it up, but I think it is somewhere around 2.5 or 2.8. That sounds lower than, you know, a turnover ratio of 7 or something like that, which really has no exact meaning, but that 2.5, 2.7 comes out of a number of economic models, one called implant, and I think that is a pretty solid figure. So you are looking at an additional 1.8 jobs for every oil and gas job.

Mr. TERRY. That is interesting, and so—and the other part about this is when a pump is just there and it is on such a very small pad, less than the size of half of this room, the landowners were telling us how pleased they were.

Mr. POLZIN. They were very pleased.

Mr. TERRY. They were making royalties off of that. And it is interesting to me that States like New York are fighting oil and gas production in their States when I—it—Mr. Siegel, in the last 27 seconds, why would States not want to use their natural resources to elevate especially lower income people in their State?

Mr. SIEGEL. Wealthy people want a pristine environment. If you are a wealthy person living in New York City and you have a summer home upstate, you don't want economic growth. But besides that, there is something that has come out of the universities, that is the idea that progress as was traditionally understood was industrialization, but industrialization in much of academia is seen negatively. It is seen as producing the effluents of modern economic society, and there is a desire to avoid that.

So on a local level, you ask people why don't you want fracking, they will say too many roughnecks, too many crowded roads, too many prostitutes. And then you push them a little and you ask and you say, well, but doesn't this reduce economic inequality? Won't this pass? And then pumping—you will talk about—is there. That is what they are opposed to. They don't want industrialization. They don't want manufacturing to revive. What gentry liberals want is the status quo for themselves, and that is very difficult to deal with, and that is a function of extreme wealth. We have considerable wealth in New York concentrated in the New York metro area, coming out of the financial services, and as upstate declines and declines further, it is easier to buy properties up there and that is fine for some people.

Mr. WHITFIELD. Gentleman's time has expired.

At this time, recognize the gentleman from New York, Mr. Tonko, for 5 minutes.

Mr. TONKO. Thank you, Mr. Chair.

Dr. Weinstein, just a clarification on the end portion of your statement about contrasting the renewables with oil and gas and subsidies. Did you state that there are no subsidies on oil and gas?

Mr. WEINSTEIN. No, I didn't say that.

Mr. TONKO. What did you say?

Mr. WEINSTEIN. I said that in the last 5 years—5 or 6 years, according to the Obama administration, 75,000 new jobs had been created in renewable energy, and then I added that Federal subsidies for renewables have been about \$50 billion over that period. I then said that the oil and gas industry has added more than 700,000 jobs over that period with no new subsidies.

Mr. TONKO. What are the subsidies on oil and gas?

Mr. WEINSTEIN. This can take us very far afield of the hearing today—

Mr. TONKO. No, but just—

Mr. WEINSTEIN [continuing]. Because I would argue that the oil and gas industry does not receive subsidies. What the oil and gas industry receives are tax benefits that are available to just about every manufacturing and mining—

Mr. TONKO. Isn't that semantics?

Mr. WEINSTEIN. No, it is not—well, we could turn it into a semantic argument. We can look at all of the tax preferences that are available to all industries, but no matter how you want to define them, relative to output, the subsidies to renewables are way ahead of any—

Mr. TONKO. And—

Mr. WEINSTEIN [continuing]. Of any definition of subsidies—

Mr. TONKO. OK, so are—

Mr. WEINSTEIN [continuing]. Through fossil fuel.

Mr. TONKO [continuing]. Are your tax benefits permanent?

Mr. WEINSTEIN. Excuse me?

Mr. TONKO. Are your tax benefits for oil and gas permanent?

Mr. WEINSTEIN. Well, they are—what is in the code is in the code until they are—

Mr. TONKO. No, no, no, that is what I am asking, is it permanent?

Mr. WEINSTEIN. Well, nothing in the tax code is permanent.

Mr. TONKO. Well, I think it is a lot more permanent than some of the benefits given in subsidy format to renewables.

Let me just state, the renewable energy and energy efficiency programs are a win-win for the environment and the economy. They create jobs, save consumers money on their electric bills, and do cut dangerous carbon pollution, which is an important element of concern. Despite these benefits, or perhaps because of them, conservative activists organizations have been pushing bills and State legislative bodies to weaken or repeal State clean energy and energy efficiency programs. I find it troubling that anyone would fight efforts to make our economy more energy efficient or more energy secure by diversifying our energy options by adding renewable sources.

Mr. Clemmer, can you briefly describe what has been happening in some statehouses? Who is behind an effort to weaken or repeal clean energy and energy efficiency programs?

Mr. CLEMMER. Sure, I would be happy to. Yes, they have been under attack the last few years. The American Legislative Exchange Council, some of the groups that Mr. Tanton is associated with, the Beacon Hill Institute, the Koch brothers have been on the attack, and actually, with respect to renewable standards, I can say that they have failed miserably, with the exception of this year there was a freeze in Ohio, but in every other case, they have not gone through. And I would like to highlight an example of Kansas, for example, which has been kind of front and center for some of these attacks, and I—my feeling is the big reason why that they are failing is because they are seeing the economic development benefits of wind development in their State, and on top of that, they know from their Public Utility Commission, the Kansas Corporation Commission, that the cost of meeting these standards have been on the order of 1 to 2 percent. But the studies that are coming out from the Beacon Hill Institute, that Mr. Tanton references in his testimony, put the cost in Kansas at 45 percent increase in electricity rates. It is just, in my opinion, disingenuous and seriously flawed. I would be happy to talk about what those problems are if you would like me to.

Mr. TONKO. Thank you. In June, the Ohio Governor signed a Bill freezing the State's renewable energy standard for 2 years. He did this over the objections of not only the wind industry and environmental organizations, but also numerous companies including Ingersoll-Rand, Honeywell, Honda, Owens Corning and Whirlpool.

Mr. Nadel, your organization worked with the Ohio Manufacturing Association to document the potential costs associated with delaying implementation of the State's clean energy and energy efficiency standards. What did you find?

Mr. NADEL. We found that these energy efficiency standards would save Ohio ratepayers, businesses and consumers, more than \$5 billion by 2020. That was the mixture of lower electricity bills as well as the impact of the energy efficiency on the wholesale markets, and under supply and demand, if demand goes down, prices go down. Now that they will be saving less energy, the prices will be higher.

Mr. TONKO. Thank you, sir. And I note my time has expired, so—

Mr. WHITFIELD. Thank you very much.

At this time, recognize the gentleman from Texas, Mr. Barton, for 5 minutes.

Mr. BARTON. Thank you, Mr. Chairman.

I am—have to do a few disclosure requirements. We have an expert from Texas, Dr. Bernard Weinstein, here. He is with the Maguire Energy Institute. I know Cary Maguire very well, and it is at the Cox School of Business, I know the Cox family very well. So I am biased in that I know one of the witnesses that are here today, and I know the institution that he represents.

The title of our hearing, Mr. Chairman, is "Laboratories of Democracy: The Economic Impact of State Energy Policies," and I think it is important, as the Republican side, to emphasize that we support the rights of States to have energy policies, and, if you support that right, then you support the rights of States to have different energy policies. And that is certainly the case, if you compare my home State of Texas with the Golden Gate State of California, or the Empire State of New York.

So I am going to ask Dr. Weinstein, in terms of environmental issues in Texas, is there any evidence that, because of our energy policy, our environment is worse than New York or California?

Mr. WEINSTEIN. Well, understand that we do have a lot of intensive manufacturing industries, including refining and petrochemicals. You don't find industries of that nature prevalent in New York State, at least not to the degree we have in Texas. So, in that sense, yes, you know, we have more challenges—

Mr. BARTON. But we are in attainment in Texas on all air quality standards. The DFW area and the Houston area have been in nonattainment, but under current law, current standards, we are in attainment. If they tighten them up even tighter for ozone, we might go back into nonattainment, but certainly, we are nowhere near nonattainment status of, say, the Los Angeles basin, which has got the worse air quality in the country for 30 years in a row, and looks like they are going to keep that for another 10 or 15 years. So I am not aware of any outstanding environment issues that it put us, us being Texas, lower in the pecking order than the other

urbanized States like California, New York, Florida, that are, you know, highly populated.

Mr. WEINSTEIN. Well, no, I agree, but the point I was trying to make is that despite the fact that we do have a lot of heavy industry, you know, we have been able to maintain compliance, you know, with EPA standards across the State—

Mr. BARTON. Yes.

Mr. WEINSTEIN [continuing]. And by just about any measure you want to use, whether we are talking about air quality, water quality, any other measure of environmental quality, it is improving in Texas even as energy production increases.

Mr. BARTON. Well, we say in Texas that we have created more jobs in the last 10 years than the rest of the country combined. Is that a true statement?

Mr. WEINSTEIN. Well, not quite.

Mr. BARTON. Most of—

Mr. WEINSTEIN. Let me—I will put it this way.

Mr. BARTON. Well, compare us to California. Job—you know, California is the most populous State, Texas is number 2.

Mr. WEINSTEIN. Yes, I think—let me check my notes. I said earlier that in the last 18 months, Texas has added 548,000 jobs—

Mr. BARTON. Do you know what—

Mr. WEINSTEIN [continuing]. In 18 months. OK?

Mr. BARTON. Do you know what California has added?

Mr. WEINSTEIN. California, which is half again as large as Texas, has only added 322,000 jobs over the last 6 years. So there is really no comparison in terms of job growth.

Mr. BARTON. As a general statement, it is fair to say that Texas has created more jobs than California.

Mr. WEINSTEIN. Yes, by far.

Mr. BARTON. Unless you go back 100 years or something, or go back to 1849, I mean it is—

Mr. WEINSTEIN. About 40 percent of all the jobs created in the U.S. since 2001 have been in the State of Texas.

Mr. BARTON. OK. What is—do you know what the average electricity price in California is compared to the average electricity price in Texas?

Mr. WEINSTEIN. I don't know what specifically—

Mr. BARTON. Well, do you know what the—

Mr. WEINSTEIN [continuing]. But I know it is a lot higher in California.

Mr. BARTON. Do you know what your electricity price is at your home in Dallas?

Mr. WEINSTEIN. Well, I know that my electric bills have been falling for the last couple of years, even though the temperature has been rising, and that is because we get about 60 percent of our electricity from natural gas—

Mr. BARTON. Well, if your—

Mr. WEINSTEIN [continuing]. In the State of Texas.

Mr. BARTON. You know, interestingly, Boone Pickens didn't know what he was paying for electricity either, but if you are as smart as I think you are, you have a wife that pays the bill, you are probably paying about 9 to 10 cents retail for electricity per kilowatt. If you—

Mr. WEINSTEIN. No, actually, I think I am paying 8 1/2 cents, but remember, we have a deregulated market in Texas.

Mr. BARTON. Well, if you are in California, you couldn't find an 8 1/2 cent rate, it would be at least 20 cents, and you are lucky if you can find that.

Mr. WEINSTEIN. You are probably right.

Mr. BARTON. Yes, I am right. I am not probably right, I am right.

Well, Mr. Chairman, let me simply say that, again, I support the rights of States to have energy policies, but if you look at my home State of Texas, we have the highest economic growth in the country, we have as good air quality and water quality as any other State in the country, and we have a private-sector-based energy policy that has created more energy over the last 100 years than any other State in the country—

Mr. WEINSTEIN. Yes.

Mr. BARTON [continuing]. And I think that is a pretty good record.

Mr. WEINSTEIN. Yes, but the energy boom in Texas, North Dakota, Pennsylvania, Ohio, and other States is benefitting the entire country by reducing our dependence on imports, by providing cheap natural gas, it is holding down power bills and heating bills for consumers and businesses across the U.S. So it is not just us energy producers who are benefitting, the whole country is benefitting.

Mr. WHITFIELD. Thank you very much.

At this time, I would like to recognize the gentlelady from Florida, Ms. Castor, for 5 minutes.

Ms. CASTOR. Thank you very much, Mr. Chairman.

This is very timely because, in the State of Florida, our Public Service Commission is considering just this week about reducing our very modest energy efficiency goals.

So I want to focus on, Mr. Nadel, your important point that it costs less to save energy than to produce energy, but there is a tension in the way States are—have organized their utility regulation. Consumers, homeowners, businesses save money when they conserve energy, but the business model for our investor-owned electric utilities that have monopolies in their service areas, they profit off of the kilowatt hour used and the large operating plants that are constructed.

Mr. Nadel, do you agree that many States have significant financial incentives to construct expensive power plants?

Mr. NADEL. Yes, I would agree with that. I would point out that a majority of States, but I don't believe this includes Florida, have revised their regulations so if sales go down, the utilities are made whole, and if they achieve energy efficiency goals, the shareholders get a little extra incentive. So those policies have worked very well, but I don't believe you have them in Florida.

Ms. CASTOR. No, in fact, we are moving backwards. We are very sensitive to this, the—and I think no matter where you are from, what your view is, you would be concerned to learn that Florida ratepayers on the west coast of Florida are on the hook for \$3 billion in costs for nuclear power plants that were damaged and not constructed. So not one kilowatt hour produced, but the ratepayers are still on the hook for \$3 billion because the State of Florida had

the utilities advocated for an advanced recovery fee so that rate-payers would pay in advance to construct these very expensive plants, but didn't protect the consumer when it come to the fact if the business—if the utility made a bad business decision, or, in effect, broke their nuclear power plant.

So, Mr. Nadel, what could Floridians have done with \$3 billion in the energy efficiency realm if we had those monies to devote to the investments under energy efficiency?

Mr. NADEL. You could have made some very large and cost-effective investments in energy efficiency. I don't know the exact amount, but you could have reduced—

Ms. CASTOR. Give us some examples. Just what could you spend \$3 billion on that would help—

Mr. NADEL. Right.

Ms. CASTOR [continuing]. Those things—

Mr. NADEL. New, more efficient air conditioners. You have quite a demand for air conditioning.

Ms. CASTOR. So we could have purchased air conditioners for more cost-efficient air—I guess energy—more energy efficiency appliances.

Mr. NADEL. Right. There is a new generation of air conditioners that uses variable speed drives, advanced controls to save 30 percent or more compared to the air conditioners that—

Ms. CASTOR. And air conditioning in Florida—

Mr. NADEL [continuing]. Were common a few years ago.

Ms. CASTOR [continuing]. Is very important, so I bet we could have purchased a lot of other insulation for—

Mr. NADEL. Right, absolutely.

Ms. CASTOR [continuing]. Weatherized homes.

Mr. NADEL. Yes. You could have helped your industry. You do have quite a bit of industry, as one of the other witnesses pointed out, and helped them to be more efficient and more competitive there.

Ms. CASTOR. Well, that sounds like a huge job creator. If I could get a lot of folks working at home and construction, and weatherizing homes and installing installation and all of these appliances.

Mr. NADEL. Right.

Ms. CASTOR. Do you agree?

Mr. NADEL. Yes. No, I agree. No, energy efficiency does tend to be the low-cost resource. I would say the majority of utilities around the country have been very supportive of energy efficiency. I wouldn't count the Florida utilities among them.

Ms. CASTOR. Yes, so why—what do we do with this outdated business model if all of the incentives are on kilowatt hours produced and building large, expensive power plants, it would seem like, you know, especially with the challenges of the changing climate, we have to begin to look at a more modern business model for our utilities, so maybe they—maybe there is an incentive to make a little money on promoting conservation.

Mr. NADEL. Yes. No, I agree. As I mentioned briefly, the majority of States now have adjustments to rates, so if sales go down, utilities can recover their fixed cost, they don't have to eat them, and also that they give the shareholders incentives if they meet their

energy saving goals. So these are very modest cost adjustments, but they make it in the business interest of the utility to do what is in their interest.

Ms. CASTOR. Thank you very much.

Mr. WHITFIELD. The gentlelady yields back.

At this time, recognize the gentleman from Illinois, Mr. Kinzinger, for 5 minutes.

Mr. KINZINGER. Well, thank you, Mr. Chairman, and thank you all for being here and providing us with some great testimony.

We have been discussing, obviously, and I am going to ask this of Mr. Tanton, Mr. Clemmer suggested the Federal Government should establish a Federal mandate that requires electric utilities to procure at least 25 percent of their power for renewable resources by 2025.

A very similar mandate was instituted in my home State of Illinois in 2007 that demanded almost the exact same thing through a program called the Renewable Portfolio Standard. This program specifically mandated that 25 percent of the electricity sales in Illinois come from renewable resources by 2026, but it has since faltered dramatically with the Illinois legislature, which, by the way, is overwhelmingly Democrat, coming to the conclusion this past ring—this past spring that they should look at reversing this detrimental program.

In addition to this, just last month, the Beacon Hill Institute at Suffolk University released a study on the potential impacts of the RFS in Illinois, and here are just a few of the negative impacts—or RPS, I am sorry, the negative impacts that this mandate will have on Illinois families going forward. The RPS mandate will cost Illinois electricity customers an additional \$4.5 billion over current prices from 2014 to 2026. Disposable income will drop by an expected \$793 million. The Illinois economy, already suffering very drastically by our government in Springfield, will shed some 8,000 jobs. And some industrial businesses will see costs rise by nearly \$300,000.

Mr. Tanton, I see you have done some of your own work in analysis of California's policies on the topics. What do you think the impact of a Federal mandate on this issue would be to the average American, should a Federal mandate such as this be put in place?

Mr. TANTON. It would be devastating. Anybody that argues that prices go down or stability increases as a result of renewable portfolio standards is being disingenuous. If the renewables were more cost-effective, they would be adopted by the market, period. There are not a lot of irrational business leaders. The renewable portfolio standard tries to force-fit something in where it doesn't. It recognizes the energy but not the capacity needs of a grid. I have studied California, I have studied many other States, I have worked internationally. We see, in fact, FERC's own data shows that the States with the renewable portfolio standards have seen more rampant increase in electricity prices than States without them. That is a fact.

Now, I would argue, however, looking at the forecast going forward, we need to keep in mind that those forecasts should be viewed probabilistically, not deterministically. It is not dueling banjos, it is not dueling forecasts. I am the first to admit that fore-



casts are wrong, but the fact that forecasts are wrong should give us information of use. And I will use the debacle in 2000 in California as an example. The bidding protocol was predicated on having a surplus supply. We put in place, basically, reverse Dutch auction which only works, as it turns out, in surplus supply situations. Well, we found ourselves in a supply deficit situation, which was not what the forecast had said. I know because I was responsible for the forecast.

As it turned out, had we put in place a bidding protocol and a market clearing protocol of bid as paid, rather than the reverse Dutch auction, during those periods of supply shortage, we would have turned a—what ended up as a \$30 billion hit to the California economy, into maybe a \$3 billion hit. Still bad, but nowhere near as bad.

Mr. KINZINGER. Right. And just the 55 seconds I have left, what can the Federal Government do or do better to help States in designing and implementing their own energy policies?

Mr. TANTON. I think today's hearing is a good example of what the Federal Government, broadly speaking, should do, and that is to provide more competent information, comprehensive information, and reduce the advocacy information. Recognize that we are a country of 300 million people, and 300 million people are 300 million more brains, with all due respect, than 435 members of Congress or the various State legislatures. The more brains that are put on making choices, the better the choice ends up. We will have a more diverse situation if we have more of a free market environment within which to work.

Mr. KINZINGER. Well, thank you, sir.

And time flies. Mr. Chairman, I will yield back.

Mr. WHITFIELD. The gentleman's time has expired.

And at this time, recognize another gentleman from New York, Mr. Engel, for 5 minutes.

Mr. ENGEL. Thank you. Thanks very much. Thanks very much, Mr. Chairman.

You know, when it comes to this—these policies, I am about as open-minded as you can get. I am for renewables, but I understand that we cannot go from step 1 to step 10 overnight, and that fossil fuels are going to have to be used at least for a while, and so it would seem to me that we should all be working for ways to get the cost down, but at the same time, we don't want to pollute the environment, and I think that it is a very delicate balance that we have to look at.

The United States, obviously, needs to have a national energy policy. We want to reduce dependence on foreign oil, we want to keep our districts clean, and we want to lower Americans' energy bills, and we try to somehow throw everything into the mix. But in my State of New York, we do have a model for a policy that I think could be implemented at the national level. Governor Cuomo announced the Reforming Energy Vision Initiative, which is a proposal to reform New York's energy grid by shifting away from centralized plants, and instead having utility companies purchase energy from a multitude of small producers. This change would allow for greater reliance on smaller, cleaner sources, and reduce our de-

pendence on a small number of plants like Indian Point, which has its troubles, very few miles from my district.

So let me ask Mr. Clemmer, because in addition to the environmental and safety advantages of the Governor's initiative, I believe his proposal would also produce economic benefits. Wind and solar power create jobs. So, Mr. Clemmer, could you discuss what kinds of benefits these initiatives like Governor Cuomo's proposal might yield, and might this be an approach that other States can use as well?

Mr. CLEMMER. Sure. The—good question. The—we put out a report in April that looked at the impacts of climate change on the electricity grid, and there are several different climate impacts that pose vulnerability. And we have seen an increase in frequency and severity of impacts that have caused power outages that have cost lots of money. And the initiative that New York is pursuing is probably more comprehensive than I have seen anybody else do, but there are other examples of States that are trying to implement similar types of programs in which—obviously, it is spending money to harden the electricity grid is important, but we also need to reduce carbon emissions as well so that we can reduce the cost that climate change is having on the grid. And so things like energy efficiency, distributed generation, solar PV, other renewables that are smaller, when an extreme weather event knocks out some facility like that, it has less impact on the grid than it does if it is a large nuclear plant or a large coal plant. And some of the recent extreme weather events that we have seen, both with the polar vortex, but also with actually heat waves, have caused lots of problems with large nuclear and coal plants in particular.

One of the impacts from heat and drought, which is directly related to climate change, is that those plants use a tremendous amount of water, and renewables like wind and solar don't use any water. Efficiency, obviously, reduces the need for water as well, so it helps reduce the vulnerability of the electricity grid to those types of impacts.

Mr. ENGEL. Mr. Nadel, would you essentially agree with that?

Mr. NADEL. Yes, I would. New York is to be commended for really taking a lead at looking at the future of the utility industry. A lot of people in the industry are starting to think about it, but New York is really taking the lead.

The industry is changing in dramatic ways, as just about everybody in the industry will agree, and it is time to reform regulation to address the 21st century industry, not the 19th century industry.

Mr. ENGEL. Thank you.

Mr. Clemmer, the Beacon Hill study has been referenced a couple of times, and I know you have some serious concerns about it. I would like to give you a chance to elaborate on that.

Mr. CLEMMER. Sure. I mentioned a couple of times some of the flaws in these studies, so let me just outline a few of them quickly.

One is that they, first of all, assume it is going to pretty much all be wind that meets the RPS, which, obviously, there are other choices, but for the most part wind has been a large contributor to the State RPS's, but they have assumed that wind costs are 2 to 4 times what the actual wind contract prices have been in the

United States, documented actual real projects. They are also assuming transmission costs that are ridiculously high, 3 times as high as what projects have cost. There is a recent project that just went in in Texas that is facilitating wind projects there.

The assumptions that they make around the impact of integrating wind, which Mr. Tanton has referred to several times, are way overblown. Wind does not need one-to-one backup for all of its generation. It does provide mostly energy to the system as he said, but there have been studies by regional grid operators, utilities all over the country looking at 20 to 30 percent renewables from variable sources that have shown very small costs for doing that, because we—utility grid operators have been doing this for decades. They have to manage the variability that comes from demand, from other power sources going off-line, and their systems are built to accommodate that. And so as we move towards more natural gas, that actually increases the flexibility on the grid to accommodate more renewables. And so those are just some of the assumptions that lead to really, really high cost estimates from their studies.

Mr. ENGEL. Thank you. Thank you—

Mr. TANTON. Can I respond a little bit?

Mr. ENGEL. Yes.

Mr. TANTON. I think too often, people equate price with cost. Yes, the prices paid to wind developers are low, but that doesn't mean that the costs are low because other people are paying the cost. We refer to transmission costs, but keep in mind, when the capacity factor for wind is only 30 percent, the capacity factor for that associated transmission is also only 30 percent. That will easily triple to you per kilowatt hour transmitted cost.

Mr. WHITFIELD. The gentleman's time has expired.

And at this time, recognize the gentleman from Louisiana, Dr. Cassidy, for 5 minutes.

Mr. CASSIDY. Thank you.

Mr. Nadel, we all agree in conservation, absolutely, and I like your graph about the cost benefit ratio of conservation versus other things.

Looking at your graph though on summary of State scores on conservation, and then looking at something on the Web as the kind of ranking of utility costs, there is an inverse relationship, if you will. The higher the State scored, typically the higher their utility cost. So that makes sense; you are going to have more savings, therefore, more inducing—inducement, if you will, to invest in conservation if you are a high-cost utility State, but there also is, I think, somewhat of a relationship between low-cost energy and economic growth. So the States with the lower cost energy are more vibrant, and the States with the higher cost energy are either losing members of Congress, or staying flat. I say that because members of Congress reflect population. So New York has lost several members of Congress, Massachusetts has lost members of Congress, et cetera.

Now, that begs the question, in States with high utility costs, is there an inverse relationship with prosperity? I think we have made a good case in Texas, which picked up 4 members of Congress, has a pretty vibrant economy, and Massachusetts losing a

member of Congress, or New York losing members of Congress, maybe not as much.

Any thoughts on that?

Mr. NADEL. OK. A couple of comments. First, I would note, regardless whether you are a high-cost State or a low-cost State, there is a lot of energy efficiency that is cost-effective as shown by Louisiana, for example, which has just decided to have their utilities do energy efficiency programs. All the major utilities have just proposed that.

Yes, if your costs are lower, that will help attract businesses, absolutely. I point out that there is a tendency for the rural States to have lower costs than some of the urban States. Transmission and distribution systems tend to be much more expensive in urban areas.

The other thing I would point out is that rates are one thing, but bills are also very important. It is that combination of rates plus the consumption. There was just this week something published by WalletHub on average energy bills, and many of the least efficient States actually had the highest average bills.

Mr. CASSIDY. Well, the least efficient States are often, if you will, hot States, and so they are going to have a higher—Louisiana is going to have a higher utility bill than a very moderate northern California climate, so I will accept that.

Now, I am also interested, there is in these States—somebody spoke of the prosperity in California. California has a little bit of an hourglass economy, as does New York, with some really wealthy people and lots of poverty, but a middle class getting squeezed, Dr. Weinstein, do you have a sense of blue-collar job growth in Texas, Louisiana, et cetera, versus other States, because I think of oil and gas giving us upstream and downstream, blue-collar, middle class job growth. Is that a fair statement?

Mr. WEINSTEIN. What we are seeing is a fairly mass exodus of small and medium-sized manufacturers and other businesses from California, New York and some other States to places like Texas.

Mr. CASSIDY. Now, that is associated with high utility costs. Can you trace it back to high utility costs?

Mr. WEINSTEIN. I would say that if you are a—

Mr. CASSIDY. Is it causal?

Mr. WEINSTEIN. If you are a manufacturer that uses a lot of electricity, clearly, that is going to be a factor, and—

Mr. CASSIDY. So if your input cost is that much higher for a major thing, a major input, which is electricity, you are going to move to a low-electricity State.

Mr. WEINSTEIN. Yes, of course.

Mr. CASSIDY. Of course. Makes sense.

Mr. WEINSTEIN. If there are other factors that make it worth the move, but—

Mr. CASSIDY. Mr. Siegel—actually, no, I am just out of time. Mr. Siegel, I am going to read your book, “Revolt Against the Masses.” I love that title.

Mr. SIEGEL. Thank you.

Mr. CASSIDY. But I do get a sense, in New York, you speak of the elites basically squashing the economic prospects of the middle

class and denying property owners the highest value of their property. Would you comment a little bit more on that, please?

Mr. SIEGEL. You talk about an hourglass economy, New York City in particular has an hourglass economy in the extreme. Wall Street is doing extremely well, real estate is doing extremely well, the middle class has been heading for the exits for a long time.

What that produces politically is a framework in which things like energy costs just aren't that important. The legislature, of which Mr. Tonko—I wish he had asked me a question—was once a member, the legislature—in New York State legislature, you are more likely to be removed by a Federal prosecutor or a State prosecutor than you are to be defeated for reelection.

Mr. CASSIDY. But let me—then, Mr. Siegel, it seems to me, though, if we are going to relate high utility costs with low economic growth, and migration of blue-collared jobs to States with low energy costs, these high energy costs, if you will, are a war on the middle class. They are destroying their economic opportunity.

Mr. SIEGEL. I think what you are describing is more true of upstate. Upstate New York, which was once the center of manufacturing, well, more recently was the center of manufacturing than downstate, there is no question. When—and now I am just—anecdotally, you will talk to people who are considering to moving to New York State because of the water. There is tremendous water available to New York, and Symantec, and so the chip industry is—to have this inexpensive water is enormously useful. However, energy costs in New York are, on average, twice the national average. That simply drives people out.

In the city, this is not a problem. In the city, it is really—it is the cost of living more generally that drives the middle class. What is fascinating to me is why it is that so many people from New York have no interest in the loss of the middle class.

Mr. CASSIDY. Because they are unaffected.

I will finish by saying blue-collar workers traditionally employed in mining, manufacturing, and construction, and I will say that energy obviously creates lots of mining jobs which I just learned tends to—I have already known but I affirmed—it tends to create manufacture. Mining begets manufacturing, because low energy costs create that, and more manufacturing begets more construction.

It seems we have a jobs program, Mr. Whitfield, and that is more use of America's natural resources. Thank you.

Mr. WHITFIELD. Dr. Cassidy, thank you very much.

And that concludes today's hearing. I want to thank all of you who participated in our panel, and I know many of you came from long distances, and it is a very important issue and we appreciate your taking time to be with us, and giving us your views and responding to our questions.

And with that, we will conclude today's hearing. The record will remain open for 10 days for any additional materials.

And I want to thank you all once again, and we look forward to working with you as we move forward to address these issues. Thank you very much.

Today's hearing is concluded.

[Whereupon, at 12:35 p.m., the subcommittee was adjourned.]

